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BULLETIN

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Studies of West Indian plants—VI

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35. THE GENUS COCCOLOBIS IN CUBA

A. Leaves 2–13 mm. long; inflorescence one- to three-flowered [RHIGIA].
- Leaves spinulose-mucronate. — 1. *C. armata.*
- Leaves emarginate at both ends. — 2. *C. microphylla.*

B. Leaves 2 cm. long or longer; inflorescence many-flowered.
1. Leaves spinulosemucronate.
   - Racemes loosely flowered; leaves acute. — 3. *C. pilonis.*
   - Racemes densely flowered; leaves acuminate. — 4. *C. woodfredensis.*
2. Leaves not spinulose-mucronate.
   - Leaves very large, suborbicular, deeply cordate; fruit large; halophytic tree or shrub. — 5. *C. Uvifera.*
   - Leaves smaller, rarely cordate; fruit small; mesophytes.
     - Pedicels filiform, in fruit 8-12 mm. long, as long as the fruit or longer.
       - Leaves flat, their margins not revolute. — 6. *C. coriacea.*
       - Leaves bullate, their margins strongly revolute. — 7. *C. Cowellii.*
     - Pedicels shorter than the fruit.
       - Rachis of the raceme glabrous.
         - Leaves almost veinless above, few-veined beneath, rounded, or emarginate. — 8. *C. nipensis.*
         - Leaves reticulate-veined on both sides.
           - Fruiting pedicels 2.5–4 mm. long; fruit 8–12 mm. long. — 9. *C. laurifolia.*
           - Fruiting pedicels 1.5 mm. long or less; fruit smaller.
             - Leaves obtuse or emarginate at apex, obtuse at base. — 10. *C. retusa.*
             - Leaves acuminate or acute.
               - Leaves acuminate at both ends. — 11. *C. cubensis.*
               - Leaves acute at apex, oblique at base. — 12. *C. colomensis.*

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Rachis of the raceme puberulent or pubescent (or glabrous in *C. Wrightii* ?).
- Raceme stout, 8–20 cm. long; leaves 8–17 cm. long; flowers sessile.
  - Leaves loosely reticulate-veined; flowers white. 13. *C. costata.*
  - Leaves densely reticulate-veined; flowers bright red. 14. *C. Shaferi.*
- Raceme slender, shorter; leaves smaller.
  - Leaves not reticulate-veined above.
    - Raceme geniculate. 15. *C. geniculata.*
    - Raceme not geniculate.
      - Fruiting pedicels less than 0.5 mm. long. 16. *C. rufescens.*
      - Fruiting pedicels 1–2 mm. long.
        - Leaf-margins reflexed. 17. *C. reflexa.*
        - Leaf-margins not reflexed. 18. *C. praecox.*
  - Leaves reticulate-veined above.
    - Leaves short-acuminate. 19. *C. benitensis.*
    - Leaves acute or obtuse.
      - Pedicels 0.8 mm. long or less.
        - Leaves coriaceous, oblong-lanceolate, 5 cm. long or less. 20. *C. pallida.*
        - Leaves chartaceous, ovate or elliptic, larger.
          - Racemes as long as the leaves or longer; petioles 5–10 mm. long. 21. *C. diversifolia.*
          - Racemes shorter than the leaves; petioles 3 mm. long or less. 22. *C. brevipes.*
      - Fruiting pedicels 1.5–3 mm. long. 23. *C. Wrightii.*

1. C. ARMATA C. Wright; Griseb. Cat. Pl. Cub. 62, 283. 1866

TYPE LOCALITY: Near San Marco.

DISTRIBUTION: Dry, rocky hills, Oriente, Santa Clara. Endemic.

The plant becomes much larger than the original description indicates; on the Rio San Juan, Santa Clara, it forms a tree 6 m. high, and on the United States Naval Station, Guantanamo Bay, Oriente, trees up to 10 m. high were observed.

2. C. MICROPHYLLA C. Wright; Griseb. Cat. Pl. Cub. 62. 1866

TYPE LOCALITY: Western Cuba.

DISTRIBUTION: Coastal thickets, Santa Clara, Pinar del Rio. Endemic.

At Coloma, Pinar del Rio, forms a virgate tree 5 m. high.

3. C. PILONIS Urban, Repert. 13: 445. 1914

TYPE LOCALITY: Loma Pilon, near Holguin, Oriente.

DISTRIBUTION: Barren rocky soil, Oriente, Santa Clara (?). Endemic.

The Santa Clara specimens, collected near the city of Santa Clara (*Britton & Wilson 6189*, *Britton & Cowell 13325*), are in foliage only and thus not determinable with certainty.

Both this species and the following one are related to *C. flavescens* Jacq., of Hispaniola. The type is from a shrub 1.6 m. high.

4. **Coccolobis woodfredensis** sp. nov.

Similar to *C. pilonis*, and to *C. flavescens* Jacq. (of Hispaniola), the leaves spinulose-mucronate. A shrub, 6 m. high, glabrous throughout, the rather stout branches zig-zag; leaves coriaceous, ovate to ovate-lanceolate, 3–6 cm. long, shining above, dull beneath, inconspicuously veined, the under surface very finely reticulated, the apex spinulose-mucronate, the base rounded, obtuse or subcordate, the stout petioles scarcely 2 mm. long; racemes very narrow, 3–4 cm. long, densely many-flowered; fruiting pedicels about 1 mm. long; old fruit ovoid, acutish, 4 mm. long, 2 mm. thick.

Dry rocky hillside, between Piedra Gorda and Woodfred, Sierra Nipe, Oriente, 400–500 m. alt. (*Shafer 3180*).

5. C. UVIFERA (L.) Jacq. Enum. 19. 1760

TYPE LOCALITY: Shores of the Caribbean Sea.

DISTRIBUTION: Coastal thickets, all provinces and Isle of Pines; occasionally on hillsides back from the coasts: Florida; West Indies; continental tropical America.

6. C. CORIACEA A. Rich. in Sagra, Hist. Cub. 11: 184. 1850

C. calobotrys Meisn. in DC. Prodr. 14: 157. 1857.

TYPE LOCALITY: Vuelta de Abajo, Cuba.

DISTRIBUTION: Pinar del Rio (?), Havana, mountains of Oriente. Endemic.

Meisner cites Sagra's Nos. 290 and 544, on which he based *C. calobotrys*, from the vicinity of Havana, but the plant is not known to grow in Havana Province. I have not seen the type specimens. A specimen from Ensenada de Mora, Oriente (*Britton, Cowell & Shafer 13003*), is from a slender tree 7 m. high.

7. **Coccolobis Cowellii** sp. nov.

A glabrous shrub, 1.5 m. high, with few, stout, ascending branches. Leaves thick-coriaceous, shining, deeply cordate at the nearly sessile base, bullate, with strongly revolute margins, diversiform, some ovate to ovate-elliptic, 5–9 cm. long, rounded at the apex, some elongated-lanceolate, attenuate-acuminate, 10–18 cm. long; principal venation impressed above, prominent beneath; ultimate venation obscure on both surfaces; racemes terminal, nearly sessile, 1–3 dm. long, the rachis and pedicels glabrous; pedicels filiform, 3–6 mm. long, spreading; bracts scarcely 1 mm. long, ovate, acute, about as long as the nearly truncate ochreolae; flowers bright red, 3 mm. long; perianth-lobes oblong, obtuse; fruit ovoid, acute, 4 mm. long, crowned by the calyx-lobes.

Barren rocky soil, savannas near Camaguey (*Britton & Cowell 13151*).

8. C. NIPENSIS Urban, Repert. **13**: 445. 1914

TYPE LOCALITY: Pine lands, 500–650 m. alt., Sierra Nipe, near Woodfred, Oriente.

DISTRIBUTION: Mountains of northern Oriente. Endemic.

This species is noted by Dr. Shafer as forming a tree up to 10 m. high.

9. C. LAURIFOLIA Jacq. Hort. Schoen. **3**: 9. *pl. 267*. 1798

C. floridana Meisn. in DC. Prodr. **14**: 165. 1857.

TYPE LOCALITY: Caracas.

DISTRIBUTION: Thickets and woodlands at lower elevations near the coasts, Oriente, Camaguey, Matanzas, Isle of Pines: Florida; Bahamas; Jamaica; Hispaniola to St. Croix; Venezuela.

10. C. RETUSA Griseb. Cat. Pl. Cub. 61. 1866

C. leoganensis parvifolia Griseb. Cat. Pl. Cub. 61. 1866. Hyponym.

TYPE LOCALITY: Eastern Cuba.

DISTRIBUTION: Thickets and hillsides, Oriente, Santa Clara, Pinar del Rio: Hispaniola (?).

11. C. CUBENSIS Meisn. in DC. Prodr. **14**: 162. 1857

TYPE LOCALITY: Cuba [near Santiago].

DISTRIBUTION: Oriente. Endemic.

Dr. Shafer's *4229*, from rich woods in the alluvial valley of Rio Yamaniguey, northern Oriente, referred to this species from description, is from a tree 5 m. high.

12. **Coccolobis colomensis** sp. nov.

A glabrous shrub, 2 m. high, with slender twigs. Leaves chartaceous, ovate to elliptic, 4–10 cm. long, bluntly acute at the apex, obliquely obtuse at the base, strongly reticulate-veined and shining on both sides, the rather stout petioles 6–10 mm. long; racemes glabrous, terminal, nodding, much shorter than the leaves, 5 cm. long or less; ochreolae less than 0.5 mm. long; pedicels about 1.5 mm. long, spreading; flowers about 1 mm. long, the ovate perianth-lobes as long as the tube; anthers not exserted; young fruit ovoid, about 3.5 mm. long, short-coronate.

Marsh near Coloma, Pinar del Rio (*Britton & Gager 7037*).

13. C. COSTATA C. Wright; Sauvalle, Anales Acad. Habana **7**: 343. 1870

C. leoganensis cordata Griseb. Cat. Pl. Cub. 61. 1866. Hyponym.

TYPE LOCALITY: Cuba [*C. Wright 1393*, eastern Cuba].

DISTRIBUTION: Mountains of Oriente; Porto Rico.

Dr. Shafer's *3084*, which satisfactorily matches *Wright 1393*, is from a tree 8 m. high, at 400–500 m. alt. on the Sierra Nipe, in dry rocky thickets; he noted the flowers as white and the fruit red-black.

14. **Coccolobis Shaferi** sp. nov.

A shrub or small tree up to 4 m. high, the twigs and leaves glabrous. Leaves coriaceous, ovate or ovate-elliptic to lanceolate, 12 cm. long or less, strongly and rather densely reticulate-veined on both sides, obtuse, acute or acuminate at the apex, cordate at the base, the stout petioles about 1 cm. long; spikes dense,

slender, 6–12 cm. long, the rachis, bracts and ochreolae puberulent; flowers bright red, sessile, about 5 long, the short perianth-lobes rounded.

Hillsides and thickets, northern Oriente.

Type, *Shafer 4165*, from between Camp Toa and Camp La Barga, 400–450 m. alt.

15. C. GENICULATA Lindau, Bot. Jahrb. 13: 141. 1891

TYPE LOCALITY: Near Puerto Principe, Cuba.

DISTRIBUTION: Known only from the type locality.

Referred by Grisebach to *C. punctata parvifolia* Griseb.

16. C. RUFESCENS C. Wright; Sauvalle, Anales Acad. Habana 7: 343. 1870

C. punctata parvifolia Griseb. Mem. Am. Acad. II. 8: 175. 1860.
C. rufescens longifolia Lindau, Bot. Jahrb. 13: 143. 1891.

TYPE LOCALITY: Cuba.

DISTRIBUTION: Mountains of Oriente. Endemic.

17. C. REFLEXA Lindau, Bot. Jahrb. 13: 141. 1891

TYPE LOCALITY: Cuba [*Wright 2256*].

DISTRIBUTION: *Britton & Cowell 13115*, from a tree 6 m. high, in savannas near Camaguey, appears to be the same as *Wright 2256*.

18. C. PRAECOX C. Wright; Lindau, Bot. Jahrb. 13: 142. 1891

TYPE LOCALITY: Cuba.

DISTRIBUTION: Known only from the type specimens (*Wright 2253*).

19. **Coccolobis benitensis** sp. nov.

A much-branched shrub, up to 2 m. high, the twigs more or less tortuous, glabrous. Leaves coriaceous, ovate, or elliptic-ovate, 1.5–7 cm. long, glabrous, punctate, short-acuminate at the apex, rounded or obtuse at the base, densely prominently reticulate-veined on both sides, the primary veins prominent beneath, the petioles 1.5–4.5 mm. long; spike-like racemes very slender, short-stalked, 4 cm. long or less, the ochreae and rachis puberulent; flowering pedicels scarcely longer than the ochreolae, 0.5 mm. long or less; fruiting pedicels 1–1.5 mm. long; perianth (young) about

0.5 mm. long; fruit ovate-ellipsoid, 5–6 mm. long, about 3 mm. thick, dark red.

Wet mountains of northern Oriente. Type from vicinity of Camp San Benito, 900 m. alt. (*Shafer 4049*).

20. C. PALLIDA C. Wright; Griseb. Cat. Pl. Cub. 61. 1866

TYPE LOCALITY: Western Cuba, near San Marco.

DISTRIBUTION: Known only from the type locality [*Wright 2254*].

21. C. DIVERSIFOLIA Jacq. Enum. 19. 1760

TYPE LOCALITY: Caribbean Islands.

DISTRIBUTION: Cuba, collected by Read, according to Lindau: Bahamas; Jamaica; Hispaniola; Porto Rico; Vieques; St. Thomas; St. Jan; St. Croix; Saba; Anguilla (?); Antigua; Montserrat; Guadeloupe; Dominica; Martinique; St. Lucia; Barbadoes; Bonaire; Curaçao; Aruba. Planted in Bermuda.

22. **Coccolobis brevipes** sp. nov.

Twigs slender, densely puberulent. Leaves chartaceous, elliptic, 3–7 cm. long, bluntly acute at the apex, obliquely narrowed or rounded at the base, shining above, glaucescent beneath, glabrous and strongly reticulate-veined on both sides, the principal veins prominent beneath; petioles stout, 2–3 mm. long; racemes terminal, about 5 cm. long, densely puberulent; bracts puberulent, acute, scarcely 1 mm. long; ochreolae about as long as the bracts; flowering pedicels 0.5–0.8 mm. long; flowers about 1.5 mm. long, the perianth-lobes ovate.

Cuba (*Wright 2257* in herbarium of the Missouri Botanical Garden). Lindau, in Bot. Jahrb. 13: 152, cites this number as part of *C. Wrightii* Lindau, but the specimen here described is different from *Wright 1395*, the type of *C. Wrightii*.

C. brevipes is similar to *C. rufescens* C. Wright in leaf-form and pubescence, but the venation is quite different.

23. C. WRIGHTII Lindau, Bot. Jahrb. 13: 151. 1891

TYPE LOCALITY: Near Monte Verde, Oriente.

DISTRIBUTION: Mountains of northern Oriente.

Referred by Grisebach to *C. tenuifolia* L.

36. ADDITIONAL SPECIES OF TABEBUIA Gomez

The type species is *Bignonia Tabebuya* Vell., of Brazil, a species with simple leaves. It is not possible to separate the group into two genera, the one with simple, the other with compound leaves, as has been proposed by several authors,* calling the compound-leaved species Tecomas, and the true type of *Tecoma* Juss. is *Bignonia stans* L. (*Tecoma stans* HBK., *Stenolobium stans* Seem.). The two-lipped calyx of the type species of *Tabebuia* is not constant through the group.

Tabebuia Brooksiana sp. nov.

A tree, up to 30 m. high. Leaves 4–7-foliolate; petioles 12 cm. long or less; petioles slender, 1–4 cm. long; leaflets oblong, oblong-lanceolate or oblong-oblanceolate, chartaceous, 5–12 cm. long, 4 cm. wide or less, faintly shining above with the veins impressed, dull, mostly finely reticulate-veined when mature, and lepidote beneath, with the midvein and lateral veins prominent, obtuse, acute or retuse at the apex, the base obtuse or acutish; flowers clustered; calyx 2-lipped, 10–15 mm. long; corolla pink, 5–6 cm. long, the tube about 5 mm. long, the narrowly campanulate throat about 3.5 cm. long, the limb about 1.5 cm. long, its undulate lobes ciliolate.

Woodlands, provinces of Oriente and Camaguey, Cuba, from sea-level up to 350 m. altitude. Type from Ensenada de Mora, Oriente (*Britton, Cowell & Shafer 12985*). Referred by Grisebach to *Tecoma Leucoxylon* Mart. and to *T. Leucoxylon reticularis* Griseb. The species is named in honor of Mr. Theodore Brooks of Guantanamo, who has rendered important aid to scientific exploration. *Tecoma heptaphylla* A. Rich. in Sagra, Hist. Cub. 11: 106 (not Martius), described as with 7-foliolate leaves from Vuelta de Abajo (Pinar del Rio), Cuba, is not known to me; I have seen no species with 7-foliolate leaves from western Cuba.

Tabebuia Shaferi sp. nov.

A tree, up to 10 m. high. Larger leaves 6–8-foliolate; petioles 3–4 cm. long; petiolules 2 cm. long or less; leaflets ovate-oblong to suborbicular, chartaceous, the larger 6 cm. long, 3–5 cm. wide, dark green above, paler beneath, minutely and densely reticulated

* See Urban, Symb. Ant. 7: 377.

on both sides, the midvein impressed above, prominent beneath, the apex rounded or obtuse, the base subcordate; "flowers pinkish"; capsule 12 cm. long; seeds 5 mm. long, 7 mm. wide, the wings 5 mm. wide.

Along a small stream in the Pinales southeast of Paso Estancia, Oriente, Cuba (*Shafer 1710a*). Apparently the same as *C. Wright 3043*, referred by Grisebach to *Tecoma Leucoxylon* Mart., *forma foliolis latioribus*.

Tabebuia pachyphylla sp. nov.

A tree, up to 12 m. high. Petioles stout, 6–8 cm. long; petiololes stout, 4 cm. long or less; leaflets 5–7, oblong to ovate-oblong, coriaceous, 5–12 cm. long, 2.5–6 cm. wide, lustrous above, dull and densely minutely reticulate-veined beneath, the midvein prominent, the lateral veins slender, the apex bluntly acute, the base rounded or subcordate; flowers pink, clustered; calyx 15 mm. long, bluntly lobed; corolla pink, glabrous, about 5 cm. long, its narrow throat about twice as long as the limb, its lobes rounded.

Mountains of northeastern Cuba. Type specimen collected at Arroyo del Medio, Sierra Nipe, Oriente, Cuba, 450–550 m. alt. (*Shafer 3645*).

Tabebuia trinitensis sp. nov.

A tree up to 10 m. high. Leaves 4-foliolate or 5-foliolate; petioles slender, 8–11 cm. long; petiolules slender, 4 cm. long or less; leaflets thin-chartaceous, oblong or oblong-lanceolate, dark green above, paler and lepidote beneath, the larger ones 11–15 cm. long, 3–4 cm. wide, bluntly acute or acuminate at the apex, obtuse at the base, finely reticulate-veined and the primary venation rather prominent on both sides.

Hanabanilla Falls, Trinidad Mountains, province of Santa Clara, Cuba (*Britton, Earle & Wilson 4866*).

The description is from leaf-specimens only but these indicate that the tree is a species distinct from all others of Cuba. The ultimate venation and texture of the leaflets differentiate it from *T. Brooksiana* Britton.

Tabebuia calcicola sp. nov.

A slender tree, up to 6 m. high. Leaves 2–5-foliolate; petioles stout, lepidote, 4–5 cm. long; petiolules lepidote, 1.5 cm. long or less: leaflets coriaceous, light green, ovate to ovate-oblong, 3.5–8

cm. long, 5 cm. wide or less, acute or bluntish at the apex, rounded at the base, finely reticulate veined and densely lepidote on both sides, the primary venation impressed above, prominent beneath; flowers clustered; pedicels stout; calyx 12–14 mm. long, shortly 2-lipped; corolla about 5 cm. long, the tube about 5 mm. long, the campanulate white throat 3 cm. long, the pink limb about 1.5 cm. long, the undulate lobes ciliolate; capsule 10–14 cm. long.

Limestone rocks and cliffs, province of Pinar del Rio, Cuba. Type collected near Guane (*Britton & Cowell 9772*).

Tabebuia moaensis sp. nov.

A shrub, about 1 m. high. Leaves 3–5-foliolate; petioles stout, 2 cm. long or less; petiolules rather stout, 4–15 mm. long; leaflets elliptic to obovate, coriaceous, 3–5 cm. long, 1–2 cm. wide, lustrous above, dull and minutely reticulate-veined beneath, the primary venation not very prominent; calyx 10 mm. long, 2-lipped; corolla pink, about 4 cm. long, its rounded lobes ciliolate.

Camp La Gloria, south of Sierra Moa, Oriente, Cuba (*Shafer 8264*). This is, apparently, the same as *C. Wright 3047*, referred by Grisebach to *Tecoma haemantha*.

Tabebuia pinetorum sp. nov.

A shrub, about 2.6 m. high. Leaves 3-foliolate or 4-foliolate; petioles very stout, only 3 cm. long or less, petiolules stout, 3–8 mm. long; leaflets elliptic or ovate-elliptic, coriaceous, 5–14 cm. long, 2.5–8 cm. wide, shining above, obtuse, rounded or bluntly short-pointed at the apex, obliquely cordate at the base, dull, lepidote and finely reticulate-veined beneath, the primary venation impressed above, prominent beneath; peduncles stout; calyx 12 mm. long, somewhat 2-lipped; "flowers lilac"; pod 11 cm. long, about 1 cm. thick.

Pine woods, Baracoa, Oriente, Cuba (*Underwood & Earle 1362*).

Tabebuia arimaoensis sp. nov.

A small tree with slender, whitish twigs. Leaves 3-foliolate; petioles slender, 1–2.5 cm. long; leaflets subcoriaceous, shining above, with the midvein impressed dull beneath with the midvein prominent, lepidote on both sides, acute, the terminal one with a petiolule 2–5 mm. long, cuneate-oblanceolate, 4–5 cm. long, 8–12 mm. wide, the lateral ones sessile, narrowly oblong, inequilateral, obliquely narrowed at the base. Flowers and fruit unknown.

Rocky hillside, Rio Arimao, province of Santa Clara, Cuba (*Britton & Wilson 5797*).

Tabebuia arenicola sp. nov.

A tree 7 m. high. Leaves 3-foliolate; petioles slender, 1–2.5 cm. long; leaflets subcoriaceous, shining, sparingly lepidote, and obscurely veined above, dull, closely lepidote and with prominent midvein and slender lateral veins beneath, inconspicuously reticulate-veined, obtuse or emarginate at the apex, the terminal one oblanceolate, 6–7 cm. long, 1.2–2 cm. wide, acute at the base, with a petiolule 4–6 mm. long, the lateral ones oblong, 4–6 cm. long, sessile by a very oblique base.

Sandy plain, Conde Beach, Guantanamo Bay, Oriente, Cuba (*Britton 2142*).

Tabebuia geronensis sp. nov.

Twigs stout. Leaves 1–3-foliolate; petioles slender, 1 cm. long or less; in 3-foliolate leaves, the lateral leaflets sessile, the terminal one short-stalked; leaflets oblong to ovate-elliptic or ovate-oblong, subcoriaceous, 3.5–7 cm. long, 3 cm. wide or less, obtuse and rounded or apiculate at the apex, rounded, subcordate, or lateral ones obliquely narrowed at the base, dull on both sides, lepidote above, finely and strongly reticulate-veined and densely lepidote beneath; fruiting calyx densely lepidote, 1 cm. long; capsule 8–9 cm. long, about 8 mm. thick, with a slender tip 6 mm. long.

Nueva Gerona, Isle of Pines, Cuba (*A. H. Curtiss*, May, 1904).

Tabebuia Curtissii sp. nov.

Young twigs, leaves, pedicels and calyx densely lepidote-scurfy. Leaves 3-foliolate, or the upper and lower 1-foliolate; leaflets coriaceous, those of 1-foliolate leaves elliptic, 3–6 cm. long, obtuse at both ends, those of 3-foliolate leaves obovate or oblong-obovate, 8 cm. long or less, abruptly acute at the apex, narrowed at the base, the terminal one short-stalked, the lateral ones sessile, all smooth and shining above, dull, reticulate-veined and densely lepidote beneath; flowers in terminal clusters; pedicels 2 cm. long or less; calyx narrowly campanulate, 1.5 cm. long, its teeth triangular, acute; corolla 5 cm. long, its lobes broad and rounded.

Nueva Gerona, Isle of Pines, Cuba (*A. H. Curtiss*, May, 1904).

Tabebuia crassifolia sp. nov.

A tree, 5 m. high. Leaves simple, oblong-elliptic, coriaceous, 6–12 cm. long, 4.5 cm. wide or less, obtuse or emarginate at the apex, somewhat narrowed at the base, when young densely lepidote and dark green above, pale and more densely lepidote beneath; when old strongly shining, elepidote and with impressed midvein above, remaining densely lustrous-lepidote and with very prominent midvein beneath, the secondary venation slender, neither surface reticulate-veined, the stout lepidote petioles 10–14 mm. long; flower solitary in an upper axil, its slender peduncle 3 cm. long, bearing a linear bractlet 2 mm. long below the middle; calyx densely lepidote, 1 cm. long, lobed but scarcely two-lipped; corolla light purple, about 5 cm. long.

By a spring, barren savannas southeast of Holguin, Oriente, Cuba (*Shafer 1285*).

Tabebuia angustata sp. nov.

A tree up to 12 m. high. Leaflets 3–7-foliolate; petioles slender, 5–13 cm. long; petiolules slender, 5 cm. long or less; leaflets chartaceous, oblong or oblong-lanceolate, 5–18 cm. long, 9 cm. wide or less; dull on both sides, more or less lepidote, at least when young, densely and finely reticulate-veined beneath with a prominent midvein and slender lateral veins, the apex bluntly acuminate or acute, the base obtuse or acute; flowers clustered; calyx 2-lipped, 12–16 mm. long; corolla rosy-white, 5–6 cm. long, its narrow throat somewhat longer than the limb, its lobes ciliate; capsule 10–25 cm. long.

Woodlands and along streams at lower and middle elevations in wet or moist parts of Jamaica. Type collected on the southwestern slope of Dolphin Head (*Harris 9253*). This tree has been referred to *Tecoma platyantha* Griseb.

Tabebuia jamaicensis sp. nov.

A tree up to 12 m. high. Leaves 5-foliolate; petioles stout, 15 cm. long; petiolules stout, 2–9 cm. long; leaflets chartaceous, the three upper obovate, 18–23 cm. long, 9–12 cm. wide, somewhat narrowed at the base, the two lower ovate-elliptic, about 10 cm. long and 6 cm. wide, rounded or subtruncate at the base, all abruptly acuminate at the apex, finely reticulate-veined and loosely lepidote on both sides, the midvein and lateral veins prominent beneath; corolla whitish, glabrous, 5 cm. long, its cylindric tube about 8 mm. long, its campanulate throat 2.5 cm. long, its spreading limb about 1.5 cm. long, its lobes erose.

Hillside, Negril, Jamaica (*Britton 2020*). The description is based on one leaf and one flower.

Tabebuia actinophylla (Griseb.)

Tecoma actinophylla Griseb. Cat. Pl. Cub. 194. 1866.

TYPE LOCALITY: Western Cuba.

DISTRIBUTION: Limestone cliffs, province of Pinar del Rio, Cuba.

Tabebuia Sauvallei nom. nov.

Tecoma sanguinea C. Wright; Sauvalle, Anales Acad. Habana 6: 320. 1870. Not *Tabebuia sanguinea* DC.

TYPE LOCALITY: Border of Rio Carbuni, Manacal, near Trinidad, Cuba.

DISTRIBUTION: Hillsides and river banks, near Trinidad, province of Santa Clara, Cuba.

Tabebuia Buchii (Urban)

Tecoma Buchii Urban, Symb. Ant. 3: 375. 1903.

Known only from the type locality, dry calcareous mountains, Morne La Pierre, Haiti.

Tabebuia lepidota (HBK.)

Bignonia lepidota HBK. Nov. Gen. 3: 139. 1818.

Tecoma lepidota DC. Prodr. 9: 220. 1844.

TYPE LOCALITY: Havana, Cuba.

DISTRIBUTION: Barren soil, provinces of Camaguey, Santa Clara, Matanzas and Havana, Cuba; Bahamas.

Referred by Grisebach to *Tecoma lepidophylla* and to *Tecoma Leucoxylon* and by Combs to *Tabebuia lepidophylla*.

The species consists, apparently, of many races, differing in size, number and form of leaflets and size of flowers.

Tabebuia Berterii (DC.)

Tecoma Berterii DC. Prodr. 9: 220. 1845.

TYPE LOCALITY: Santo Domingo.

DISTRIBUTION: Hispaniola, ascending to 1,200 m. altitude.

Tabebuia domingensis (Urban)

Tecoma domingensis Urban, Symb. Ant. 7: 376. 1912.

TYPE LOCALITY: Near Barahona, Santo Domingo.

DISTRIBUTION: Known only from the type locality.

Tabebuia revoluta (Urban)

Tecoma revoluta Urban, Symb. Ant. 7: 539. 1913.

TYPE LOCALITY: Between La Vega and Jarabacoa, Santo Domingo, at 700 m. alt.

DISTRIBUTION: Known only from the type locality.

Tabebuia acrophylla (Urban)

Tecoma acrophylla Urban, Symb. Ant. 3: 374. 1903.

TYPE LOCALITY: Mountains near Bilboro, Haiti, at 600 m. alt.

DISTRIBUTION: Known only from the type locality.

Tabebuia bibracteolata (Griseb.)

Tecoma bibracteolata Griseb. Cat. Pl. Cub. 193. 1866.

TYPE LOCALITY: Eastern Cuba.

DISTRIBUTION: Known only from the type specimens.

TABEBUIA HETEROPHYLLA (DC.) Britton, Ann. Mo. Bot. Gard. 2: 48. 1915

Rapuntia (?) *heterophylla* DC. Mém. Mus. Paris 9: 153. 1822.

Tabebuia triphylla DC. Prodr. 9: 214. 1845. Not *Bignonia triphylla* L.

Sandy soil and rocky hillsides, Mona, Porto Rico, Vieques, Culebra, St. Thomas, St. Croix, St. Jan, Virgin Gorda, Anagada; recorded from St. Barts and Barbadoes.

Referred by Grisebach to *Tecoma Berterii* DC., and by Urban to *Tecoma Leucoxylon* (L.) Mart.; this is not *Tabebuia leucoxyla* DC. Prodr. 9: 212.

Tabebuia myrtifolia (Griseb.)

Tecoma myrtifolia Griseb. Mem. Am. Acad. II. 8: 524. 1862.

Tecoma lepidota myrtifolia Maza, Anal. Hist. Nat. Madrid 19: 265. 1890.

? *Bignonia microphylla* A. Rich. in Sagra, Hist. Cub. **11**: 104. 1850. Not Lam.

TYPE LOCALITY: Matanzas, Cuba.

DISTRIBUTION: Coastal thickets, vicinity of Matanzas, Cuba.

Tabebuia platyantha (Griseb.)

Tecoma platyantha Griseb. Fl. Br. W. I. 447. 1864.

Tecoma Brittonii Urban, Symb. Ant. **5**: 496. 1908.

Tecoma Brittonii decussata Urban, loc. cit. 497. 1908.

TYPE LOCALITY: On rocks, St. James, Jamaica.

DISTRIBUTION: Rocky woodlands, central parishes of Jamaica.

Tabebuia bahamensis (Northrop)

Bignonia pentaphylla L. Sp. Pl., ed. 2, 870. 1763 (as to the Bahama plant of Catesby). Not *Tabebuia pentaphylla* (Juss.) Hemsl.

Tecoma bahamensis Northrop, Mem. Torr. Club **12**: 65. *pl. 15*. 1902.

TYPE LOCALITY: Near Nassau, New Providence, Bahamas.

DISTRIBUTION: Bahamas; Cuba.

37. THE GENUS ANASTRAPHIA D. Don

Type species: *Anastraphia ilicifolia* D. Don.

Founded on a specimen in the Lambertian Herbarium said to have come from South America; the plant was correctly attributed to Cuba by De Candolle (Prodr. **7**: 26. 1838).

1. Involucral bracts straight, erect or nearly so.
   Involucre 2.5–3 cm. long.
      At least some of the leaves spinulose-dentate.
         Involucre campanulate.
            All the involucral bracts lanate. 1. *A. ilicifolia.*
            Only the outer bracts lanate, the inner glabrous.
               Leaves distinctly reticulate-veined above.
                  All the involucral bracts linear-lanceolate, acuminate and erect. 2. *A. manuensis.*
                  Outer involucral bracts lanceolate, merely acute, all somewhat spreading. 3. *A. montana.*
               Leaves very indistinctly reticulate-veined above, but wrinkled; outer bracts ovate. 4. *A. Cowellii.*
         Involucre long-attenuate at base, all its many bracts lanate. 5. *A. attenuata.*

None of the leaves spinulose-dentate.
Involucral bracts tomentose. 6. *A. Picardae.*
Inner involucral bracts glabrous. 7. *A. crassifolia.*
Involucre 2 cm. long or less.
Involucre 1.5–2 cm. long.
Leaves or some of them 1.5–2 cm. long.
Inner involucral bracts obtusish or short-pointed. 8. *A. oligantha.*
Inner involucral bracts acuminate. 9. *A. bahamensis.*
Leaves 12 mm. long or less.
Leaves strongly spinulose-dentate. 10. *A. calcicola.*
Leaves repand-denticulate. 11. *A. parvifolia.*
Involucre 1.5 cm. long or less.
Leaves 2–3 times as long as wide.
Leaves spinulose-denticulate.
Leaves strongly reticulated beneath. 12. *A. Wilsoni.*
Leaves not reticulated beneath, or faintly reticulated.
Achenes short-tomentose; leaves reticulate-veined above. 13. *A. interlexta.*
Achenes villous; leaves smooth above. 14. *A. Shaferi.*
Leaves entire-margined. 15. *A. obtusifolia.*
Leaves not longer than wide, or but little longer.
Leaves obtuse or truncate at base.
Involucre 6 mm. long. 16. *A. microcephala.*
Involucre 10 mm. long. 17. *A. Rosei.*
Leaves cuneate at base. 18. *A. Buchii.*
2. Involucral bracts recurved, or with recurved tips.
Involucral bracts arachnoid. 19. *A. Northropiana.*
Involucral bracts villous. 20. *A. recurva.*
3. Involucre known only in a young condition; leaves oblong, 4 cm. long, 1.8 cm. wide, entire-margined or with a tooth near the apex. 21. *A. lomensis.*

1. ANASTRAPHIA ILICIFOLIA D. Don, Trans. Linn. Soc. **16**: 296. 1830

Gochnatia ilicifolia Less. Linnaea **5**: 261. 1830 (attributed to Guiana doubtfully).

TYPE LOCALITY: South America [in error].

DISTRIBUTION: Limestone cliffs and river-gorges, provinces of Matanzas and Havana, Cuba. A shrub 2–3 m. high, the leaves shining above.

A specimen in Kew Herbarium from rocks on the Rio Canimar, Cuba, 1823, bears the label *Staehelina ilicifolia* Mutis., but that species is a South American *Gynoxys*.

2. ANASTRAPHIA MANTUENSIS C. Wright; Griseb. Cat. Pl. Cub. 158. 1866

TYPE LOCALITY: Pine lands near Mantua, Cuba.

DISTRIBUTION: Pine lands and rocky hillsides, near Mantua, Province of Pinar del Rio, Cuba.

3. **Anastraphia montana** sp. nov.

A depressed, spreading or prostrate shrub, the young twigs white-floccose. Leaves oblong, or oblong-oblanceolate, 2–4 cm. long, 8–16 mm. wide, coriaceous, sharply spinulose-dentate all around, dark green, shining and densely reticulate-veined above, white-floccose beneath, obtuse or acutish at the apex, the floccose petioles 1–2 mm. long; heads solitary at the ends of branches; involucre campanulate about 2.5 cm. high, its bracts rigid, somewhat spreading, in about 8 series, the outer ovate to lanceolate, slightly lanate, acute, the inner linear-lanceolate, acuminate glabrous achenes linear, narrowed at base, densely appressed-pubescent, 6 mm. long; pappus light brown, spreading, about twice as long as the achene.

Top of Sierra Caliente, south of Sumidero, Pinar del Rio, Cuba, August, 1912 (*Shafer 13781*).

4. **Anastraphia Cowellii** sp. nov.

A shrub, 2 m. high, the young twigs lanate-puberulent. Leaves oblong, 1.5–3.5 cm. long, 6–15 mm. wide, coriaceous, sharply spinulose-dentate, green, glabrous, shining and indistinctly veined, but wrinkled above, brownish-floccose beneath, mostly obtuse at the apex, obtuse or narrowed at the base, the petioles 1–4 mm. long; heads solitary or rarely 2 together; involucre narrowly campanulate, about 3 cm high, its bracts in 7 or 8 series, the outermost ovate, lanate, the middle ones lanceolate, the inner linear-lanceolate, acuminate, glabrous; corollas orange, 2 cm. long; achenes linear, 6–7 mm long, densely pubescent; pappus brownish, spreading, about 3 times as long as the achene.

Rocky hills, palm barren, city of Santa Clara, Cuba (*Britton & Cowell, 10183, type*); same locality (*Britton & Wilson 6073*); rocky places in savanna, Queen City to Minas, Camaguey, Cuba (*Shafer 2927*); savanna near Camaguey (*Britton & Cowell 13248*).

5. **Anastraphia attenuata** sp. nov.

A shrub about 2.5 cm. high, the young twigs densely lanate. Leaves oblong to oblanceolate, 1.5–5 cm. long, 8–17 mm. wide,

coriaceous, entire or some of them remotely spinulose-dentate, green, glabrous and reticulate-veined above, whitish-lanate beneath, obtuse or acute at the apex, narrowed at the base, the petioles 1–2.5 mm. long; heads solitary at the ends of branches; involucre obconic, long-attenuate at the base, 3–3.5 cm. long, its bracts lanate, imbricated in about 14 series, the lower ovate, the upper lanceolate; corolla yellow, about 1 cm. long; achenes linear, densely pubescent, 6 mm. long; pappus tawny, a little longer than the achene.

Moist thickets, Sierra Nipe, Oriente, Cuba, between Piedra Gorda and Woodfred, at 400–500 meters elevation (*Shafer 3113*).

6. ANASTRAPHIA PICARDAE Urban, Symb. Ant. 3: 414. 1903

TYPE LOCALITY: Near Cadets, Haiti, at 1200 m. alt.

DISTRIBUTION: Known only from the type locality.

7. **Anastraphia crassifolia** sp. nov.

A shrub about 1.6 m. high, the young twigs densely tomentose. Leaves oblong, or oblong-oblanceolate, coriaceous, 4–7 cm. long, 1–2 cm. wide, entire-margined, green, shining, and with impressed veins above, lanate-tomentose and with prominent veins beneath; involucre campanulate, nearly 3 cm. high, its bracts in 7 or 8 series, the outer ovate, lanate, the inner linear-lanceolate, glabrous, long-attenuate.

Near mangroves, mouth of Rio Yamaniguey, Oriente, Cuba (*Shafer 4261*). Only one old involucre was collected.

8. ANASTRAPHIA OLIGANTHA Urban, Symb. Ant. 3: 417. 1903

TYPE LOCALITY: Santo Domingo.

DISTRIBUTION: Santo Domingo. Known only from the type specimens collected by Wright, Parry and Brummell in 1871, and from *plate 123, f. 2*, of Plumier, with which they were identified by Professor Urban. Referred to by Hitchcock (Rep. Mo. Bot. Gard. 4: 102) as *A. pauciflosculosa* C. Wright, an unpublished species.

9. ANASTRAPHIA BAHAMENSIS Urban, Symb. Ant. 3: 415. 1903

Anastraphia pauciflosculosa Hitchc. Rep. Mo. Bot. Gard. 4: 102. *pl. 12.* 1893. Hyponym.

Anastraphia cuneifolia Greenm. Bull. N. Y. Bot. Gard. 4: 126. 1905.

TYPE LOCALITY: Andros Island, Bahamas.

DISTRIBUTION: Andros, Eleuthera, Cat Island, Fortune Island, Crooked Island, Acklin's Island, Great Exuma, Caicos Islands, Mariguana, Dellis Cay, Inagua.

I cannot distinguish, specifically, from this species, a plant of the Sierra Nipe, Oriente, Cuba (*Shafer 3185*).

10. **Anastraphia calcicola** sp. nov.

A shrub, 1–1.5 m. high, the young twigs lanate, the branches stiff. Leaves cuneate-obovate or nearly elliptic, small, 5–10 mm. long, nearly as wide as long, sharply 1–3-toothed on each margin, coriaceous, obtuse or subtruncate at the apex, glabrous and densely reticulate-veined above, white-lanate beneath, the petioles about 1 mm. long; heads solitary on short branchlets; involucre 1.5–2 cm. high, its bracts in about 4 series, loosely and sparingly lanate, the outer ovate, acute, the inner narrowly lanceolate, acuminate; achenes linear, 4 mm. long, densely pubescent; pappus yellowish-brown, about 3 times as long as the achene.

Coral rock hillsides and coastal cliffs, United States Naval Station, Guantanamo Bay, Oriente, Cuba (*Britton 2042, type; 2220*).

11. **Anastraphia parvifolia** sp. nov.

An upright shrub, 2 m. high, the young twigs lanate. Leaves oblong to oblong-obovate, small, 5–10 mm. long, 4–6 mm. wide, coriaceous, obtuse at the apex, obtuse or narrowed at the base, dark green, smooth and shining above, white-lanate beneath, the margin repand-denticulate, the slender petiole 1–3 mm. long; involucre about 2.4 cm. long, its bracts in 5 or 6 series, the outer ovate to ovate-lanceolate, loosely lanate, acute, the inner linear-lanceolate, acuminate, with lanate tips; corolla orange-yellow, 18 mm. long; achenes linear, densely pubescent, about 3 mm. long; pappus yellowish-brown, about 5 times as long as the achene.

Dense thickets in barren savannas southeast of Holguin, Oriente, Cuba (*Shafer 2938*).

12. **Anastraphia Wilsoni** sp. nov.

An intricately branched shrub 2 m. high, the young twigs somewhat lanate. Leaves oblong to oblong-obovate, subcoria-

ceous, 1–2.5 cm. long, 1 cm. wide or less, obtuse or acute at the apex, narrowed at the base, green, shining, and densely finely reticulate-veined above, brownish-tomentulose and prominently veined beneath, the margins strongly spinulose-dentate, the slender petioles 1.5–3 mm. long; heads solitary on short branchlets; involucre 1–1.5 cm. high, its bracts in about 8 series, the outer ovate, acute, densely lanate, the inner lanceolate to linear-lanceolate, attenuate, nearly glabrous; corolla 1.5 cm. long; achenes densely pubescent, 5 mm. long; pappus tawny, 3 times as long as the achene.

Rocky bank, Rio Toyaba, near Trinidad, province of Santa Clara, Cuba (*Britton & Wilson 5573*).

13. ANASTRAPHIA INTERTEXTA C. Wright; Griseb. Cat. Pl. Cub. 158. 1866

TYPE LOCALITY: Near San Marcos, district of Bahia Honda, Pinar del Rio, Cuba.

DISTRIBUTION: Mountain sides, Pinar del Rio, Cuba.

14. **Anastraphia Shaferi** sp. nov.

An intricately branched shrub 2–2.5 m. high, the young twigs lanate. Leaves oblong to oblong-oblanceolate, 10–18 mm. long, 8 mm. wide or less, coriaceous, sharply spinulose-dentate, obtuse at the apex, narrowed at the base, green, glabrous and smooth above, whitish-lanate and rather prominently veined beneath, the petioles about 1.5 mm. long; heads solitary or sometimes 2 together at the ends of branchlets; involucre about 1 cm. long, its villous-lanate bracts in about 5 series, the outer ovate, the inner lanceolate, acuminate; corolla "whitish," about 11 mm. long; achenes villous-pubescent, 3 mm. long; pappus tawny, 2–3 times as long as the achene.

Dry cliff, below the falls of Rio Naranja, Oriente, Cuba, 450–550 m. elevation (*Shafer 3865*).

15. **Anastraphia obtusifolia** sp. nov.

An intricately branched shrub, the young twigs lanate-tomentulose. Leaves oblong to oblanceolate, 2.5 cm. long or less, 4–10 mm. wide, coriaceous, entire-margined, dark green and finely densely reticulate-veined above, white-lanate and inconspicuously veined beneath, obtuse at the apex, narrowed at the base, the petioles 1–1.5 mm. long; head (only one old one seen

attached) sessile, lateral; involucre 9–10 mm. long, its bracts in 5 or 6 series, the outer ovate, acute; the inner linear-lanceolate, acuminate.

Camp La Gloria, south of Sierra Moa, Oriente, Cuba (*Shafer 8189*).

16. ANASTRAPHIA MICROCEPHALA Griseb. Cat. Pl. Cub. 158. 1866

TYPE LOCALITY: Eastern Cuba.

DISTRIBUTION: Known only from the type specimens collected by Wright.

17. **Anastraphia Rosei** sp. nov.

A shrub with tortuous branches, the young twigs floccose. Leaves broadly elliptic, elliptic-obovate or suborbicular, 10–15 mm. long, 8–13 mm. wide, obtuse or nearly truncate at the apex, obtuse or subtruncate at the base, dark green, loosely floccose or becoming glabrate, and finely reticulate-veined above, densely white-tomentulose and with few rather prominent veins beneath, spiny-toothed, with 2 or 3 teeth on each side, the slender tomentulose petioles 3–5 mm. long; heads solitary and sessile on short spurs, about 10-flowered; involucre narrowly obconic, 10–11 mm. long, its bracts in about 5 series, all appressed-villous, acute, the outer ovate, the inner linear-lanceolate; achenes densely silky, 4 mm. long; pappus yellow-brown, 8 mm. long.

Hillside, Azua, Santo Domingo, March 18, 1913 (*Rose, Fitch & Russell 4023*). Related to *A. Buchii* Urban, of Haiti, which has leaves cuneate at base, smaller heads and less hairy involucre-bracts.

18. ANASTRAPHIA BUCHII Urban, Symb. Ant. 5: 527. 1908

TYPE LOCALITY: Dry woods, Poste Coudau, Haiti, at 100 m. elevation.

DISTRIBUTION: Known only from the type locality.

19. ANASTRAPHIA NORTHROPIANA Greenm.; Combs, Trans. Acad. Sci. St. Louis 7: 435. *pl. 36.* 1897

Anastraphia Northropiana Combsii Urban, Symb. Ant. 3: 417. 1903.

TYPE LOCALITY: Fresh Creek, Andros, Bahamas.

BAHAMA ISLANDS: Andros, New Providence, Cat Island.

CUBA: On rocky coastal hills, Punta Piedra, Nipe Bay, Oriente (*Britton & Cowell 12459*); harbor of Santiago, Oriente (*Britton 1877*); near Nuevitas, Camaguey (*Shafer 839*); Calicita, Santa Clara (*Combs 521*); Rio San Juan, Santa Clara (*Britton, Earle & Wilson 5839, 5864*); apparently the same species, collected in foliage only, on Cayo Ratones, Bay of Mariel, Pinar del Rio (*Britton & Gager 7678*). I cannot specifically distinguish the Cuban plant from the Bahamian; on the southern coast of Santa Clara Province it forms a tree up to 10 m. high with a trunk 2 dm. in diameter; its bark is very rough.

20. **Anastraphia recurva** sp. nov.

A much-branched shrub up to about 3 m. high, the young twigs tomentulose. Leaves oblong to elliptic or oblanceolate, coriaceous, 4 cm. long or less, 8–15 mm. wide, green and smooth or somewhat reticulate-veined above, lanate beneath, obtuse or acute at the apex, cuneate-narrowed, acute or obtuse at the base, spinulose-dentate or entire, the petioles 1.5–3 mm. long; heads solitary at the ends of branchlets; involucre broadly campanulate, 1.5–1.8 cm. high, its bracts densely villous, imbricated in 6 or 7 series, recurved-spreading, linear-lanceolate, acuminate; corolla yellow or yellowish, about 1 cm. long; achenes densely whitish-pubescent, about 4 mm. long; pappus tawny, 2–3 times as long as the achene.

Serpentine hills near mouth of Rio Yamaniguey, Oriente, Cuba (*Shafer 4257; type*); between Rio Yamaniguey and Camp Toa, 400 m. alt. (*Shafer 4011*); vicinity of Camp San Benito, 900 m. alt. (*Shafer 4177*); Camp La Gloria, south of Sierra Moa (*Shafer 8187, 8266*); between Camp La Barga and Camp San Benito (*Shafer 4120*).

A species which has wide variation in leaf-forms; the involucre in all specimens seen appears to be the same.

21. **Anastraphia** (?) **lomensis** sp. nov.

A shrub about 2.5 m. high, the twigs tomentulose. Leaves oblong, coriaceous, about 4 cm. long and 1.8 cm. wide, entire-margined, or rarely with a spinulose tooth near the apex, spinulose-tipped and acute, or rounded at the apex, narrowed or obtuse at the base, faintly reticulate-veined, green and glabrous above, lanate and rather prominently veined beneath, the petioles 2–3.5

mm. long; heads solitary or sometimes 2 together at the ends of twigs; young involucre 1 cm. long, its floccose bracts in about 5 series, acute, the outer ovate, the inner lanceolate.

Rocky mountain side, Loma Mensura, about 800 m. alt., Oriente, Cuba (*Shafer 3811*).

The leaves are similar to those of *A. Picardae* Urban, of Haiti.

38. UNDESCRIBED WEST INDIAN SPECIES

Cyperus calcicola sp. nov.

Perennial by short rootstocks; culms slender, tufted, smooth, 1–2.5 dm. high. Leaves shorter than the culm, 0.5–1 mm. wide; bracts of the involucre 2 or 3, the longer sometimes 4 cm. long, similar to the leaves; head globose, solitary, 5–7 mm. in diameter; spikelets about 3-flowered, 3.5–4.5 mm. long; scales dark brown, the lowest empty ones persistent on the axis after the fall of the rest of the spikelet, lanceolate, the others ovate to ovate-lanceolate, acute, faintly striate-nerved.

Limestone rocks, Cayo Muertos, Porto Rico (*Britton, Cowell & Brown 4976*).

Related to *C. fuligineus* Chapm., in which the scales of the spikelet are more numerous, strongly striate-nerved and mucronate.

Psilocarya portoricensis sp. nov.

Annual, with fibrous roots; culm rather slender, about 4 dm. high. Leaves shorter than the culm, 2–3 mm. wide; umbels several, slender-stalked; spikelets 3–5 in the umbels, ovoid, acutish, 4–6 mm. long, 2 mm. thick; scales ovate, dark brown, sharply acute; style rather deeply 2-cleft; achene oblong, 1 mm. long, transversely wrinkled; tubercle triangular, acute, one third to one half as long as the achene, and distinctly decurrent upon it.

Shore of Laguna Tortuguero, Porto Rico (*Britton, Cowell & Brown 3850*).

Nearest to *P. nitens* (Vahl) A. Wood, of eastern continental North America, the achene of which is smaller, suborbicular and the tubercle scarcely decurrent.

Rynchospora borinquensis sp. nov.

Perennial by short rootstocks; culms slender, trigonous, about 6 dm. high. Leaves flat, about 2 mm. wide, shorter than the culm;

corymbs 2 or 3, distant, filiform-stalked, compound, narrow, 2–7 cm. long; spikelets clustered, fusiform, 5 mm. long, narrowed at both ends, bearing only 1 achene; scales lanceolate or oblong-lanceolate, dark brown, acute; bristles about 6, upwardly barbed, longer than the achene and tubercle; style-branches about one-third as long as the undivided part; achene oblong-obovate, faintly transversely wrinkled, 1.5 mm. long, a little longer than the smooth, conic, acute tubercle.

Open wet places in the forest, Rio Icaco and adjacent hills, Sierra de Naguabo, Porto Rico, 465–720 m. alt. (*Shafer 3515, type*); Sierra Nipe, Oriente, Cuba (*Shafer 3453, 3638*).

Apparently nearest *R. glauca* Vahl, which has shorter, ovoid spikelets, and a shorter tubercle.

Cassia clarendonensis sp. nov.

A finely pubescent shrub about 1.3 m. high. Leaves linear in outline, 10–15 cm. long, bearing an obtusely conic gland 1 mm. high between the lowest pair of leaflets, the slender, pubescent rachis angular; leaflets 10–15 pairs, thin, pubescent on both sides, with very short pubescent petiolules, apiculate, inequilateral, the upper 2 or 3 pairs oblong, 1.5–2 cm. long, 6–7 mm. wide, the others elliptic to obovate-elliptic, shorter and slightly broader; flowers in several short pubescent panicles in the upper axils; pedicels 2–4 mm. long; sepals obliquely elliptic, obtuse, pubescent, 5–6 mm. long; petals yellow, obovate, veiny, about 9 mm. long, rather abruptly short-clawed; sepals 7; larger anthers curved, 7–8 mm. long, the smaller nearly straight, about 5 mm. long; style curved, about 11 mm. long; pods short-stalked in the calyx, linear, many-seeded, densely puberulent, 7–10 cm. long, 6 mm. wide, flat, impressed between the seeds, the margins scarcely thickened; seeds oblong, transverse, pubescent, about 4 mm. long.

Inverness, Clarendon, Jamaica (*Harris 11693*).

Purdiaea velutina Britton & Wilson, sp. nov.

A shrub 3 m. tall, or a small tree; twigs villous. Leaves obovate, 4–10 cm. long, 2–3.3 cm. broad, rounded and emarginate or mucronate at the apex, gradually tapering to a rather broad sessile base, 5–7-ribbed, reticulate-veined, glabrous; bracts oblong-obovate or obovate, 15–24 mm. long, 6–9 mm. broad, velutinous on the back, glabrous within above the middle, below clothed with rather short, appressed silky hairs; peduncles and pedicels villous; one ciliate, the three outer ones unequal, ovate, 9–12 cm. long,

4–6 mm. broad, rounded or acutish and apiculate at the apex, papery, several nerved, the two inner sepals lanceolate, 5–6 mm. long, acuminate; petals lanceolate to narrowly ovate-lanceolate, 5.5–6 mm. long, 2–2.5 mm. broad, acute, glabrous; filaments subulate, glabrous; anthers oblong; ovary subglobose, villous.

Type collected along trail, Rio Yamaniguey to Camp Toa, Oriente, Cuba (*Shafer 4474*); also collected in the vicinity of Camp San Benito, Oriente, Cuba (*Shafer 4092*).

Purdiaea Shaferi Britton & Wilson, sp. nov.

A shrub 2 or 3 m. tall; twigs glabrous or nearly so. Leaves broadly elliptic-obovate, 4.5–9.5 cm. long, 2.5–4.5 cm. broad, rounded and emarginate or mucronate at the apex, sessile, 7–9-ribbed, rather faintly and coarsely reticulate-veined, glabrous; bracts obovate, 12–14 mm. long, 7–8 mm. broad, papillose; peduncles and pedicels villous; sepals 5, ciliate, the three outer sepals very unequal, broadly ovate to ovate-oval, 8–12 mm. long, 4–8 mm. broad, rounded or acute and apiculate at the apex, papery, clothed mostly toward the base with appressed, silky hairs, several-nerved, the two inner sepals lanceolate, 5–6 mm. long, 2 mm. broad, acuminate; petals elliptic, 5 mm. long, 2.5–3.2 mm. broad, mucronate, glabrous; filaments subulate, glabrous; anthers oblong; ovary globose-ovoid, hirsute; style subulate.

Type collected in pinelands, vicinity of Baracoa, Oriente, Cuba (*Shafer 4285*).

Purdiaea microphylla Britton & Wilson, sp. nov.

A shrub 1 or 2 m. tall; young twigs and branches of the inflorescence more or less hirsute. Leaves oblanceolate to obovate, 10–15 mm. long, 5–7 mm. broad, acute at the apex, cuneate at the base, sessile, rigid, faintly 3-ribbed, glabrous; sepals unequal, rigid, the three outer ones ovate to oval, 4 mm. long, 3 mm. broad, acute, the two inner sepals ovate, 3 mm. long, 1.2–1.5 mm. broad, apiculate, ciliate; fruit 5-lobed, the angles keeled, 5-celled, glabrous; style subulate, persistent.

Type collected at Camp La Gloria, south of Sierra Moa, Oriente, Cuba (*Shafer 8265*).

Piriqueta cubensis Britton & Wilson, sp. nov.

A shrub 1–3 m. tall, the young twigs grooved, velvety-ferruginous with stellate hairs. Leaves oblanceolate or obovate, 4–8 cm.

long, 1–2.2 cm. broad, obtuse or acutish at the apex, cuneate at the base, petioled, above clothed with scattered stellate hairs, beneath velvety ferruginous with stellate hairs and reticulate-veined, the midvein and lateral nerves obscure or impressed above, prominent beneath; calyx-lobes oblong-lanceolate to ovate-lanceolate, 1.2–1.6 cm. long, 6–8 mm. broad, velvety-ferruginous; petals elliptic to somewhat oblanceolate, 1.6–1.8 cm. long, 5–6 mm. broad, glandular-ciliate; filaments filiform, glabrous; anthers oblong-lanceolate; ovary narrowly ovoid, tomentose; styles filiform, 2.5–2.7 cm. long, glabrous; capsule velvety-ferruginous, the valves ovate; seeds pyriform.

Type collected along trail, Rio Yamaniguey to Camp Toa (400 m. alt.), Oriente, Cuba (*Shafer 4190*); also collected on the Sierra Nipe, Oriente (*Shafer 3109*).

Rheedia Hessii sp. nov.

Young branches angled, slender, the older ones terete. Leaves opposite, coriaceous, clustered on short lateral twigs, narrowly lanceolate, 1.5–2.5 cm. long, 6 mm. wide or less, narrowed at the base into stout petioles 2–3 mm. long, spinulose-acuminate at the apex, the midvein prominent beneath, very indistinct above, the lateral venation wholly obscure, the margins thickened; staminate flowers solitary in upper axils on pedicels about 4 mm. long; sepals suborbicular, about 3 mm. broad; petals obovate-elliptic, rounded at the apex, 5 mm. long; stamens numerous, the stout filaments 2–2.5 mm. long; anthers less than 0.5 mm. broad.

Indiera Fria, near Maricao, Porto Rico (*F. L. Stevens & W. E. Hess 3333*). In habit and in leaf-form this somewhat resembles *R. fruticosa* C. Wright, of Cuba.

Mayepea cubensis P. Wilson, sp. nov.

A shrub 6 m. tall, the young twigs glabrous or nearly so. Leaves oblong-oblanceolate, 6–9 cm. long, 1.5–2 cm. broad, rounded and often emarginate at the apex, cuneate at the base, petioled, glabrous, impressed punctate, rigid; midrib more or less impressed above, prominent beneath, the primary veins few and rather inconspicuous; panicles terminal, shorter than the leaves, the branches glabrous; bracts oblong-lanceolate or narrowly lanceolate, hirsutulous; pedicels about 2 mm. long; calyx-lobes triangular, obtuse or acutish, sparingly hirsutulous on the outside, hirsutulous within mostly at or near the apex; petals oblong or somewhat oblong-lanceolate, 5.5–6.5 mm. long, 1.2–2 mm. broad,

glabrous, obtuse, several-nerved; stamens shorter than the petals; filaments 1 mm. long; anthers elliptic-ovate to broadly elliptic; ovary ovoid, glabrous; stigma subsessile, globose-ovoid or subglobose, sometimes slightly emarginate.

Type collected at mouth of the Rio Yamaniguey, Oriente, Cuba (*Shafer 4253*).

Agalinis albida Britton & Pennell, sp. nov.

Annual; plant green, tending to blacken in drying. Stem 4–6 dm. tall, slender, with virgately ascending branches, obscurely striate-4-angled, glabrous; leaves opposite, or somewhat subopposite above, ascending or recurved-spreading, linear-subulate below to linear and longer above, entire, acute, those of the stem 1–2.5 cm. long, 0.5–1 mm. wide; bracts gradually much reduced; leaves thickened, minutely scabrous to scabro-roughened above. axillary fascicles none; racemes elongated, 2–16-flowered; pedicels ascending, slender, clavate, glabrous, in flower 0.5–1 mm. long, in fruit 2–3 mm. long, much shorter than the bracts; calyx-tube 2–2.5 mm. long, depressed-hemispheric, obscurely veined, 1/3–2/5 the length of the capsule, somewhat truncate, its lobes 0.7–1 mm. long, broadly triangular to ovate-triangular, acute to acuminate; apex of tube and lobes within sparingly puberulent; corolla 10–15 mm. long, spreading, 7–10 mm. wide, membranous, its tube 8–12 mm. long, straight to slightly upcurved, its lobes 2–3 mm. long, rounded to truncate, all somewhat spreading, without minutely pubescent, within slightly pubescent about the bases of the filaments, pubescent below sinus and over most of basal portions of posterior lobes; lobes all ciliate, white, at times shaded with violet; posterior filaments 2.5–3.5 mm. long, anterior 5–6.5 mm. long, all somewhat lanose; anther-sacs 1–1.5 mm. long, oblong-lanceolate, acute to mucronate at base, lanose-pubescent with white hairs on the valvular surface, glabrous on the sides; style 4–5 mm. long, filiform, glabrous; stigma 2.5 mm. long; capsule 4 mm. long, depressed-globose, dark-brown; seeds 0.6–0.8 mm. long, lunate-triangular to narrowly quadrangular, slightly less than one-half as broad as long, irregular; testa pale, with reticulations delicate, brown, enclosing elongated angular spaces; intrareticular lines very fine, forming a network.

Wet, grassy pineland, western Cuba, Isle of Pines, and in Jamaica.

Type, *Colpothrinax* savanna, vicinity of Herradura, province of Pinar del Rio, Cuba, collected in flower and fruit August 26–30, 1910 (*Britton, Earle & Gager 6475*).

CUBA. Pinar del Rio: Guane (*Shafer 10662*); Herradura (*Hermann 291, 565*); Laguna Jovero (*Shafer 10937*); Laguna los Indios (*Shafer 10801*); Pinar del Rio (*Wright 2991 p.p.*); San Cristobal (*Wright 2991 p.p.*), Santa Clara: Cieneguita (*Combs 443*), Isle of Pines: Managua (*Palmer & Riley 1102*).

JAMAICA. Shooter's Savanna (*Harris 11160*); Upper Clarendon (*Harris 11100*).

Differs from other species of *Agalinis* bearing short-pedicelled flowers, spreading corolla-lobes and dark brown seeds (*A. purpurea* and near allies) by its leaves strongly ascending, but 1–2.5 cm. long, its corolla much paler, nearly or quite white, and relatively small, and by its seeds which are less than one-half as broad as long.

Jacaranda Cowellii Britton & Wilson, sp. nov.

A shrub 1.5–2 m. tall, the young twigs, pedicels, calyx and corolla more or less glandular-pubescent; leaves once-pinnate, 2.5–6 cm. long, occasionally longer; petioles and rachis narrowly grooved; leaflets 8–15 pairs or more, opposite or subopposite, elliptic to oval or orbicular, 2–5 mm. long, 1.5–3 mm. broad, sessile, rigid, green and lustrous above, paler beneath, the margin strongly involute, the midvein impressed above, prominent beneath; bracts of the inflorescence oblong; calyx-lobes triangular-ovate or ovate, acutish, 2 mm. long; corolla-tube 2–2.5 cm. long, the lobes orbicular; filaments of the fertile stamens subulate, glabrous, the filament of the sterile stamen flattened, bearded below the middle, glabrous above, densely bearded at the apex; anthers oblong-elliptic; ovary ovoid, glabrous; style subulate; fruit elliptic or oblong-elliptic, the apex rounded, or abruptly short-acuminate with the tip acutish or obtuse.

Type collected in palm barrens in the vicinity of the city of Santa Clara, Cuba (*Britton & Cowell 13316*); also collected at the same locality (*Britton & Wilson 6071; Britton & Cowell 10174*); dry hill, Holguin, Oriente (*Shafer 12434*); barren savanna southeast of Holguin, Oriente (*Shafer 2940*).

Mosses from the west coast of South America

R. S. Williams

(with plates 21–25)

A list of mosses collected by Dr. and Mrs. J. N. Rose in Peru, Bolivia and Chile, July to October, 1914, while on a trip undertaken chiefly for the purpose of obtaining Cactaceae.

This collection of 41 mosses, coming as it does largely from the dry cactus region of the west coast of South America, contains for its size an unusually large number of interesting species.

Campylopus incrassatus (Kze.) C. M.

Peru: near Mollendo, *18996*.

Campylopus peruvianus sp. nov.

Sterile: plants in compact cushions with more or less branching stems, radiculose below, and 10–15 mm. high; leaves ovate-lanceolate, entire except at the apex, closely imbricate, erect-appressed when dry, somewhat spreading when moist, the upper rather larger, 3–4 mm. long, mostly with a short, rough, hyaline point rarely more than 0.5 mm. long; costa about one half the width of the leaf in the lower part, in cross-section showing stereid bands above and below the guide cells and bearing on the back about 24, not serrate, lamellae up to 4 cells in height; alar cells enlarged, mostly pale, extending to the costa; marginal cells of lower leaf narrow and elongate, forming a narrow, hyaline border sometimes extending half way up the leaf; the median cells mostly short-rhomboidal, those just above the alar, short rectangular, all with slightly thickened not pitted walls.

Peru: near Mollendo, August, *18997*.

Astomum chilense sp. nov.

Dioicous, the inconspicuous male flowers containing 5 or 6 antheridia with few paraphyses, enclosed by 2 or 3 very small inner perigonial leaves; the outer leaves being scarcely differentiated: plants in rather compact mats with simple stems about 1 mm. high, bearing radicles at base; stem-leaves up to 1.5 mm., rarely 2 mm. long, ovate-lanceolate, more or less folded and crispate when dry, rather widely spreading when moist, with flat, entire margins; costa excurrent into a short apiculus, in cross-

section showing 2 large guide cells, a rather small stereid band between them and the row of large cells next the upper surface, and below the guide cells a much larger stereid band with outer cells somewhat enlarged; cells in lower part of leaf pale, smooth, mostly short-rectangular, about 8 μ wide by 12 μ long, in upper part densely papillose, rather distinct, nearly square, about 6 × 6 μ; perichaetial leaves scarcely differentiated; seta often somewhat bent and twisted when dry, erect when moist, about 2.5 mm. long; capsule oblong, slightly wrinkled when dry, about 1 mm. long, including the short, oblique beak; spores rough, about 16 μ in diameter; calyptra cucullate, smooth, descending about half way down the capsule.

CHILE: vicinity of La Serena, October, *19290*.

GYROWEISIA BOLIVIANA R. S. Williams, Bull. N. Y. Bot. Gard. 3: 104. 1903.

PERU: Cuzco, September, *19057*.

LEPTODONTIUM GRACILE C. M.

PERU: vicinity of Lima, July, *18594*.

BARBULA FUSCINERVIA Mitt.

PERU: Juliaca, September, *19092*.

BARBULA FUSCO-VIRIDIS Broth.

CHILE: Palos Quemnados, October, *19184;* La Ligua, October, *19532*.

BARBULA REPLICATA Tayl.

PERU: near Oroya, July, *18717*; Arequipa, July, *19531;* Posco, July, *18813;* Cuzco, August, *19055*.

Pterogoneurum Roseae sp. nov.

Autoicous, the male flower terminal, the outer perigonial leaves not differentiated, the inner with a very small, pale-golden, roundish, scarcely costate blade bearing a rough, hyaline hair-point 3 or 4 times as long, enclosing 5 or 6 antheridia about 50 μ long and numerous, somewhat club-shaped paraphyses twice as long as the antheridia: plants appearing somewhat gregarious, only 2–3 mm. high, with very short stems and crowded, bud-like branches; stem leaves when dry, erect, appressed-imbricate, when moist, widely spreading, broadly ovate, serrulate nearly to the base, the blade about 1 mm. long with a rough, hyaline hair-point often exceeding the blade in length, the margins of the upper half of the blade broadly inflexed over the costa; costa expanded in the upper half, in cross-section showing a broad stereid band below

the single row of large cells bearing about 20 rows of filaments 3–5 cells high with the terminal cell often contracted into a mamillate apex; basal cells of leaf pale, short-rectangular to square, up to 20 μ wide and about 25 μ long, with walls slightly thickened at the angles, the cells about one half up the leaf becoming more or less transversely elongate, especially toward the margin, with unequally thickened, not pitted, walls; outer perichaetial leaves not differentiated, the 1 or 2 inner leaves very small, pale, narrowly lanceolate, nearly ecostate; seta reddish, 8–9 mm. high; capsule ovate-oblong, nearly symmetric and erect, 2 mm. long with the lid; lid conic, about as high as its basal diameter; peristome papillose, very irregular, from a low basal membrane, the teeth varying from long-lanceolate to little more than lobes scarcely projecting above the annulus; annulus persistent, of a single row of large cells; calyptra cucullate, smooth, extending about half way down the capsule; spores slightly rough, up to 24 μ in diameter.

PERU: vicinity of Lima, July, *18595* (type); Posco, August, *18813a*.

Crossidium Rosei sp. nov.

Autoicous, the male flowers at the apex of the branches, the inner perigonial leaves smaller than the outer, otherwise scarcely differentiated, the 6 to 8 antheridia about 0.25 mm. long, with rather numerous, often longer, filiform paraphyses: plants in rather compact mats, the short stems, with radicles at base, bearing several short branches crowded together bud-like, and 2–3 mm. high; leaves when dry appressed-incurved, often somewhat crispate, when moist, erect-spreading, ovate-oblong to oblong-spatulate, 2–2.5 mm. long, in the upper third finely papillose on both sides, the margins entire and flat or more or less recurved; costa slightly excurrent, enlarged in the upper half, in cross-section showing a large stereid band on the under side and on the upper side some 6–8 large cells, mostly in one row, bearing numerous, short, somewhat club-shaped filaments 2 or 3 cells high with the terminal cell papillose; leaf cells distinct throughout, the basal pale green, nearly square to short-rectangular, up to 20 μ wide by about 35 μ long, the median cells scarcely elongate, about 16 × 16 μ, with walls scarcely thickened; perichaetial leaves hardly differentiated, the inner usually smaller; seta rather flexuous, about 8 mm. long; capsule erect, nearly symmetric, oblong, about 1.5 mm. long with the lid; lid conic, acute, a little higher than its basal diameter, the cells, except at the base, elongate in oblique rows; peristome a papillose basal membrane extending 3 or 4 rows of cells above the persistent annulus, its margin more or less incised and bearing

here and there short lobes; calyptra cucullate, smooth, descending well below the lid; spores rough, up to 25 μ in diameter.

PERU: vicinity of Lima, July, *18774*.

PSEUDOCROSSIDIUM gen. nov.

Dioicous. Small plants with simple or slightly branched stems having a distinct central strand and leaves, when dry, erect-appressed or sometimes twisted about the stem. Stem-leaves with margins in the upper part once to twice revolute, the upper side of the revolute part with cells often much inflated or with greatly enlarged papillae. Costa broader in the upper part than below, nearly percurrent or excurrent; in cross-section about two thirds up showing 5 to 8 guide cells, mostly in one row, beneath them a large stereid band and on the upper side numerous lax, thin-walled cells in 1 to 3 layers forming a continuous, densely papillose surface or sometimes more or less broken up into filaments 2 or 3 cells high with the terminal cells papillose (occasionally, also, a thin band of stereid cells just above the guide-cells in *P. apiculatum*). Cells of the upper part of leaf not or slightly elongate, mostly obscure with crowded papillae on one or both sides, in the lower part, smooth, pale, rectangular or short, more or less transversely elongate. Perichaetial leaves greatly differentiated, the 2 or 3 inner much larger than those of the stem, convolute, pale throughout, with narrow costa mostly vanishing below the obtuse or truncate, nearly or quite entire apex. Capsule nearly cylindric and erect with a slightly oblique, subulate lid. Peristome of 32 slender, papillose teeth twisted to the left, from a low basal membrane. Annulus of 2 or 3 rows of persistent cells. Calyptra cucullate.

Type species, *P. chilense*.

Pseudocrossidium chilense sp. nov.

Evidently dioicous, the male flowers not found: plants in brownish green cushions with somewhat branching stems, 2–4 mm. high, with a very distinct central strand and walls of outer cells scarcely thickened; stem-leaves erect-appressed when dry, more or less broadly ovate, obtusely or acutely pointed, the upper about 1 mm. long, the lower shorter, rather deeply keeled above with the margins strongly revolute half way down or more; costa nearly percurrent, enlarged in the upper half, 120–140 μ wide, in cross-section above the middle showing 6 to 9 guide-cells mostly in one row, below them a large stereid band and on the upper side 2 or 3 layers of lax, thin-walled cells, those at the surface densely papillose and sometimes more or less separated; cells of upper

part of leaf scarcely elongate, about 6 μ in diameter, more or less papillose on both sides, in lower part, paler, smooth, mostly nearly square to transversely elongate, often 12 × 12 μ; perichaetial leaves projecting well above those of the stem, the 2 or 3 inner convolute, about 2 mm. long, mostly broadly rounded or truncate at the entire or nearly entire apex, the leaf-cells mostly slightly elongate throughout with lax, thin walls, smooth or finely papillose on the back in the upper part; seta erect, about 1 cm. long; capsule cylindric, about 2.25 mm. long without lid, the stoutly beaked lid nearly erect, 1 mm. long, with the elongate cells in oblique rows; peristome of 32 slender papillose teeth, twisted about one half around to the left, from a rather low basal membrane; annulus of 2 or 3 rows of small cells; calyptra cucullate, smooth; spores smooth, about 10 μ in diameter.

CHILE: near Valparaiso, September *19132b*.

Pseudocrossidium apiculatum sp. nov.

Dioicous, the outer perigonal leaves like those of the upper stem, the inner much shorter, broadly ovate, with narrow costa, enclosing numerous antheridia, 0.4 mm. long, and abundant, slightly club-shaped paraphyses: plants in compact, greenish brown mats with mostly simple stems 1 cm. high, with large, very distinct central stand and outer walls of 1 or 2 rows of rather small cells with scarcely thickened cell-walls; stem-leaves ovate-lanceolate, acute, the upper about 1.5 mm. long, appressed and mostly twisted about the stem when dry, the margins in the upper half often twice revolute; costa excurrent, apiculate, in the widest part 140–160 μ across, in cross-section showing 6 to 8 guide cells, below them a large stereid band and on the upper side 3 or 4 layers of lax, thin-walled cells forming a compact densely papillose surface or broken up into distinct filaments 2 or 3 cells high with the terminal cell papillose (sometimes also a thin band of stereid cells occurs just above the guide-cells); cells of upper leaf mostly not elongate or transversely elongate, often 12 × 12 μ, papillose on both sides, those of the revolute part often much inflated or with greatly enlarged papillae on the upper face; lower cells of leaf paler, mostly rectangular, 12–16 μ wide and 20–40 μ long; perichaetial leaves pale, convolute, the inner 2.5 mm. long or more, projecting well above the stem-leaves, somewhat obovate to oblong, the apex obtusely rounded and more or less erose, the costa narrow and vanishing a little below the apex; fruit unknown.

PERU: above Arequipa, August, *18977*.

[**Pseudocrossidium excavatum** (Mitt.) comb. nov.

To this genus I would also refer *Tortula excavata* Mitt. Jour.

Linn. Soc. **12**: 154. 1869. It has a cross section of leaf and perichaetial leaves very similar to the preceding but is a much smaller species with stem leaves only about 0.5 mm. long and lacking the sharp apiculate point. From *P. chilense* it may be at once distinguished by the basal cells which are rectangular, not mostly transversely elongate or square. The costa is also narrower, about 60 μ in the widest part. It seems to be known only from the Andes near Quito.]

Desmatodon subtophaceus (R. S. Williams) comb. nov.

Didymodon subtophaceus R. S. Williams, Bull. N. Y. Bot. Gard. **3**: 119. 1903.

PERU: above Arequipa, August, *19533;* Juliaca, September, *19099.*

CHILE: Las Vacas, near Chiapa, October, *19230.*

The stereid band is nearly or quite lacking in the upper part of the costa but present in the lower part.

TORTULA CONFUSA Card.

PERU: Cuzco, September, *19519.*

TORTULA KUNZEANA (C. M.) Mitt.

CHILE: La Ligua, *19383;* Paloma, October, *19354.*

Tortula limensis sp. nov.

Apparently mostly autoicous but occasionally synoicous, the inner perigonial leaves much smaller and paler than the outer and enclosing abundant antheridia, 0.3–0.4 mm. long, with numerous slightly longer, club-shaped paraphyses: plants in compact mats with more or less branching; stems about 1 cm. high having a very small central strand or none; stem-leaves mostly oblong, the larger about 3 mm. long by 1.5 mm. wide, appressed-contorted when dry, somewhat spreading, recurved when moist, with flat or slightly recurved crenulate and papillose margins; costa terete, slightly rough on the back, about 40 μ wide in the lower part, slightly tapering upward, excurrent into a reddish not quite smooth hair-point sometimes over one half the length of the blade, in cross-section showing 2 large guide-cells, below them a stereid band and on the upper side a few thin-walled cells in two layers, the upper surface finely papillose; cells of upper leaf not elongate, densely papillose on both sides, 16–20 μ in diameter, those of basal part pale, smooth, up to 25 μ wide and 60–80 μ long; inner perichaetial leaves very similar to those of the stem but a little larger; seta about 12 mm. long; capsule oblong, slightly curved

and nodding, 2.5 mm. long without the lid, the lid conic, in height often but little exceeding its basal diameter; peristome of 32 pale, nearly erect, very papillose teeth more or less contracted at the joints, from a basal membrane about one-tenth the height of the teeth; annulus of 1 or 2 rows of small cells adherent to the rim of the capsule; calyptra cucullate, descending well below the base of the lid; spores slightly rough, up to 25 μ in diameter.

PERU: Lima, July, *18603c* (type), *18603a;* north of Lima, July, *19523*.

A species much like some forms of *T. montana* in general appearance.

Tortula minuscula sp. nov.

Dioicous, the terminal bud-like male flower at length appearing lateral by the growth of a subapical branch; the antheridia about 0.3 mm. long, with abundant slightly club-shaped paraphyses: plants in compact, dusky green mats with often branching stems 5–8 mm. high, having a distinct central strand; stem-leaves about 2 mm. long, appressed or somewhat erect-spreading when dry, rather broadly ovate-lanceolate, entire, the margins somewhat recurved along the middle and thickened with 1 row of additional cells in the narrow-grooved point; costa percurrent, often slightly broadened and flattened near the middle of the leaf with a cross-section showing 10 to 12 guide cells, a single row of cells nearly as large on the ventral side and on the dorsal side a row of slightly smaller cells with a few stereid cells between them and the guide-cells; the cross-section near apex shows no stereid cells and only 2 guide-cells; cells of upper part of leaf very papillose on both sides, the median often slightly transversely elongate, about 5 × 8 μ, the basal short-rectangular to nearly square; perichaetial leaves very similar to those of upper stem but with slightly larger and paler base; seta 6–7 mm. long; capsule erect, ovate-oblong, about 1 mm. long without the lid; the lid slightly oblique, conic-subulate, scarcely 0.5 mm. long; peristome from a papillose basal membrane projecting well above the annulus, of 32 erect or nearly erect, very papillose teeth of irregular length; annulus of 2 or 3 rows of persistent cells; calyptra cucullate, smooth, descending well below the lid; spores smooth, about 10 μ in diameter.

PERU: Cuzco, September, *19520*.

TORTULA MURALIS (L.) Hedw.

CHILE: Viña del Mar, near Valparaiso, September, *19105*; Las Vacas, near Chiapa, *19230a*; vicinity of La Serena, *19289*; vicinity of Illapel, *19462*, *19462d*; La Paloma, October, *19522*.

ENCALYPTA EMERSA C. M.?

BOLIVIA: Comanche, August, *18884*.

This plant is perhaps distinct from *E. emersa*, of which I have seen no specimens. The Bolivian plant is autoicous with stems rather stout, about 2 cm. high; stem-leaves oblong, about 4 mm. long by 2 mm. broad, the apex rounded, the margins somewhat crenate and papillose; costa vanishing a little below the apex, rough on the back with pale spines, simple toward the apex, branching at the middle and lower part of the costa; capsule cylindric, nearly smooth, emergent, without peristome; calyptra entire at base, somewhat scabrous at apex.

ALIGRIMMIA PERUVIANA R. S. Williams, Bull. N. Y. Bot. Gard. 3: 124. 1903.

PERU: vicinity of Arequipa, August, *18823*, the locality from which the type specimens were described.

GRIMMIA MICRO-OVATA C. M.

BOLIVIA: Comanche, August, *18882a*; vicinity of Comanche, August, *18882*; vicinity of La Paz, August, *18870*.

GRIMMIA SAXATILIS Mitt.

PERU: Juliaca, September, *19091*.

ZYGODON CIRCINATUS Mitt.

PERU: near Mollendo, August, *19526*. Type specimens collected on the island of Chiloe, Chile, and apparently unknown elsewhere, excepting from this Peruvian collection.

Physcomitrium Roseae sp. nov.

Antheridia not found: plants in thin mats or somewhat gregarious, with stems about 2 mm. high, scarcely projecting above the earth over which they grow with the rosette-like cluster of leaves resting on the surface; stems with a few radicles at the base and 5 to 7 leaves clustered at the apex; leaves mostly ovate, acute, with flat, entire margins, about 2.5 mm. long by 1.5 mm. wide, with sometimes 1 or 2 much smaller inner leaves; costa percurrent, weak, in cross-section showing 5 or 6 cells of somewhat variable size without thickened walls; cells of upper part of leaf more or less hexagonal, 20–25 μ in diameter, toward the base square to rectangular, about 25 μ wide and 30–50 μ long; seta 2 mm. long; capsule subglobose, about 1.5 mm. high, without annulus and peristome, the cells about the rim elongate in 5 or 6

rows, forming a rather ill-defined border, those below to near the base very irregular, becoming at the base smaller, quite regular and with small stomata in several rows; lid nearly flat, with an ill-defined border of transversely elongate cells that become toward the center of lid much broader and larger; spores mostly roundish, smooth, 28–30 μ in diameter; calyptra (perhaps not normal) remaining attached to the seta half way down the capsule, terete-cylindric, smooth.

CHILE: near Valparaiso, September, *19176*.

FUNARIA CALVESCENS Schwaegr.

BOLIVIA: vicinity of La Paz, August, *18858*.

FUNARIA HYGROMETRICA (L.) Sibth.

PERU: vicinity of Chosica, June, *18549*; Arequipa and vicinity, August, *18822*, *19001*; Juliaca, September, *19098*.

CHILE: near Valapraiso, September, *19106*, *19107*, *19132a*; Santiago, September, *19181*.

FUNARIA MACROSPORA R. S. Williams, Bull. N. Y. Bot. Gard. 3: 133. 1903.

BOLIVIA: La Paz, August, *19463*; Araranca, August, *19527*.

PERU: Arequipa, August, *19528*. The spores in all these specimens are rough and the larger measure 25–30 μ. Possibly the species is not distinct from *F. hygrometrica*. The plants are all much larger than any specimens of *F. hygrometrica arctica* I have seen.

FUNARIA SUBERECTA Mitt.

CHILE: vicinity of Illapel, October, *19462a*.

MIELICHHOFERIA CAMPYLOTHECA C. M.

BOLIVIA: Comanche, August, *18884a*.

HAPLODONTIUM JAMESONI (Tayl.) Hpe.

PERU: Juliaca, September, *19097*.

HAPLODONTIUM SERIOLUM C. M.

PERU: Juliaca, September, *19518*.

LEPTOBRYUM PYRIFORME (L.) Wils.

BOLIVIA: Araranca, August, *19464*.

LEPTOBRYUM WILSONI (Mitt.) Broth.

PERU: Arequipa and vicinity, August, *19514*, *19517*.

ANOMOBRYUM FILIFORME (Dicks.) Husn.

PERU: above Toyatoya, August *18941;* Juliaca, September, *19101.*

BRYUM CONCAVUM Mitt.

BOLIVIA: La Paz, August *18895, 18896, 19463a.*

PERU: Arequipa, August, *19529;* Cuzco, September, *19056, 19058.*

BARTRAMIA FRAGILIFOLIA C. M.

BOLIVIA: vicinity of Comanche, August, *19524.*

Philonotis fragilicaulis sp. nov.

Flowers and fruit not known; plants in compact cushions with slender, branching stems, mostly denuded of leaves in the lower part and without radicles, 3–4 dm. long and 0.25 mm. in diameter, having a large well-defined central strand and often rough surface in the older parts from the large, mamillose-inflated outer cells; leaves nearly erect and loosely imbricate-incurved when dry, scarcely spreading when moist, ovate-pointed, about 1.5 mm. long and 0.75 mm. wide, the margins flat, serrulate in the upper part, sometimes crenulate nearly to the base; costa stout, rough on the back in the upper half, excurrent into a serrulate, short or somewhat elongate and subulate point; cells of leaf on the under surface, more especially the median cells, mamillose-inflated at the base, those of the upper leaf mostly somewhat elongate, more or less quadratic, the median 8–12 μ wide and 20–30 μ long, the basal rather larger and more rectangular.

PERU: Araranca, 4260 m. alt., August, *19513.*

POGONATUM POLYCARPUM (Schimp.) Broth.

PERU: Juliaca, September, *19100.*

HEDWIGIDIUM IMBERBE (Sw.) Bry. Eur.

BOLIVIA: vicinity of Comanche, *18883.*

FABRONIA ANDINA Mitt.

BOLIVIA: vicinity of La Paz, August, *18857, 18871;* Comanche, August, *19515.*

LESKEA GRACILLIMA Tayl.

PERU: Cuzco, September, *19059, 19530.*

One specimen (No. 18603b) is not determined. It is possibly a small *Pohlia*, but lacks fruit and may belong elsewhere.

Explanation of plates 21-25

PLATE 21

Campylopus peruvianus. 1. Plant about natural size. 2. Stem-leaf, × 18. 3. Hyaline point of leaf, × 103. 4. Basal cells on one side of costa, × 124. 5. Median cells of leaf, × 124. 6. Half a cross-section near the middle of leaf, × 124.

Astomum chilense. 7. Plant about natural size. 8. Plant, × 10. 9. Apex of leaf, × 183. 10 and 11. Upper stem leaves, × 20. 12. Lower stem leaf, × 20. 13. Median cells of leaf, × 183. 14. Cross-section of leaf about half way down, × 124. 15. Basal cells on one side of costa, × 124.

PLATE 22

Pterogoneurum Roseae. 1. Plant about natural size. 2. Upper leaf, × 10. 3. Lower leaf, × 10. 4. Inner perichaetial leaf, × 10. 5. Calyptra, × 10. 6. Cells at the shoulder of leaf about half way up blade, × 124. 7. Apex of leaf-blade, × 46. 8. Capsule, × 10. 9. Half a cross-section near the middle of leaf, × 124. 10. Part of peristome, annulus and rim of capsule, × 124. 11. Basal cells from margin extending only part of the way to costa, × 124.

Crossidium Rosei. 12. Plant about natural size. 13. Calyptra, × 11. 14 and 15. Upper and middle stem leaves, × 18. 16. Basal cells on one side of costa, × 124. 17. Capsule, × 11. 18. Median leaf cells, × 124. 19. Cross-section about one third down leaf, × 103. 20. Part of peristome, annulus and rim of capsule, × 124.

PLATE 23

Pseudocrossidium chilense. 1. Plant about natural size. 2. Plant, × 9. 3 and 4. Perichaetial leaves, × 20. 5. Basal cells on one side of costa, × 124. 6 and 7. Upper and middle stem leaves, × 20. 8. Median cells of leaf, × 183. 9. Cross-section of leaf below the middle, × 124. 10. Cross-section above the middle, × 183.

Pseudocrossidium apiculatum. 11. Plant about natural size. 12. Plant, × 6. 13. Stem-leaves, × 13. 14. Perichaetial leaf, × 13. 15. Cells in upper leaf about midway between margin and costa, × 183. 16. Cells just above the rectangular basal cells, × 183. 17. Cross-section of leaf about one third down, × 124. 18. Basal cells of leaf from margin to costa, × 124. 19. Cross-section of a second leaf, × 183.

PLATE 24

Tortula minuscula. 1. Plant about natural size. 2. Calyptra, × 14. 3. Capsule, × 14. 4. Median exothecal cells, × 124. 5. Median cells of leaf, × 183. 6. Part of peristome, annulus and rim of capsule, × 183. 7. Perichaetial leaf, × 20. 8 and 9. Stem leaves, × 20. 10. Basal cells of leaf from margin to costa, × 183. 11. Cross-sections of costa in upper part and near the middle, × 183.

Tortula limensis. 12. Plant about natural size. 13 and 14. Stem-leaves, × 6. 15. Capsule, × 6. 16. Calyptra, × 6. 17. Cross-section of leaf, × 124. 18. Apex of leaf-blade and costa on under side, × 124. 19. Median cells of leaf, × 124. 20. Basal cells of leaf from margin to costa, × 124. 21. Part of peristome, annulus and rim of capsule, × 124.

PLATE 25

Physcomitrium Roseae. 1. Plant, × 5. 2. Leaf, × 14. 3. Apex of leaf, × 100. 4. Cells about rim of capsule, × 100. 5. Cells at base of capsule surrounding a stoma, × 100. 6. Median cells of leaf, × 100. 7. Cells of lid from margin to center, × 100. 8. Basal cells of leaf from margin to near the costa, × 100. 9. Part of cross-section of leaf near the middle, × 100.

Philonotis fragilicaulis. 10. Plant, about natural size. 11 and 12. Stem leaves, × 23. 13. Median cells of leaf showing mamillae at the lower and under surface, × 183. 14. Leaf at apex, × 183. 15. Basal cells of leaf from margin to costa, × 183. 16. Part of cross-section of leaf near the middle, × 183. 17. Part of cross-section of leaf a little below the middle, × 183.

Notes on Carex—VIII

KENNETH KENT MACKENZIE

CAREX STRICTA LAM. AND ITS ALLIES

Probably the only species of *Carex* growing in the vicinity of New York, which is abundant enough to make it the distinctive feature over large areas, is the tussock sedge, *Carex stricta* Lam. Every swamp is full of the great clumps of this plant, usually very largely to the exclusion of everything else. It is with difficulty that proper herbarium specimens can be made, as the root-stocks are very heavy and stout. In fact an axe or heavy spade is needed to dig out characteristic specimens. The result is that herbarium specimens are mostly very poor and usually consist of the culms broken off as close to the ground as possible.

The distinguishing features of this common plant are its habit of forming dense tussocks (or bogs in the vernacular sense), its not being loosely and strongly stoloniferous, its intensely deep green leaves, triangular or channelled at the base, usually light brown culm bases, and but slightly hispidulous sheaths. It is a very rough plant, the perigynia are strongly granular roughened, and the scales are usually light reddish brown tinged.

Another species which is widely distributed throughout the northeastern United States can be readily told in the field, but much less easily from the usual run of herbarium specimens. This plant grows in great beds and does not form tussocks. It produces many long horizontal stolons; the leaves, at first glaucous green, in age become light green or blue green, and contrast strongly with the leaves of *Carex stricta*, when growing near it; the culms at base are brown-purplish tinged, the sheaths are strongly hispidulous, and the scales vary from blackish to dark reddish brown in age, while the leaves are flat or nearly so to the base. The perigynia are slightly more beaked than in *Carex stricta*, and the lowest bract is noticeably larger. This species is *Carex strictior* Dewey. It has often been mistaken for *Carex*

aquatilis Wahl. by discriminating collectors, who have noticed that it was distinct from *Carex stricta*, and who could find no other name apparently available for it.

By far the most widely distributed species of this group in the eastern part of the United States, is a plant to which I am applying the name *Carex Emoryi* Dewey. This is a freely stoloniferous plant growing in beds like *Carex strictior*. It, however, is a much stouter plant, and the basal sheaths are not filamentose or hispidulous. The perigynia, which are abruptly and prominently short-beaked, are smooth under an ordinary lens except towards the apex and much resemble the perigynia of the *C. aquatilis* group. This species ranges from New York, western New Jersey and Maryland to Manitoba, Colorado and New Mexico, and has at various times been referred to *Carex stricta* or *Carex aquatilis*.

A slender species of this group with a northerly range is *Carex Haydeni* Dewey. This plant has broadly oval or suborbicular perigynia which are noticeably inflated and light brownish at maturity, in these characters being readily separable from other members of the group here discussed. The scales always exceed the perigynia and the spikes are small in size. While the culms are cespitose they are much less densely so than in *Carex stricta*. As far as I can make out the habit of growth is much like that of *Carex torta*, i. e., the plant has very short ascending stolons. The basal sheaths are often, but not always, entirely free from the filamentose fibers so evident in *Carex stricta*, and the culms are usually much darkened at the base.

The first three species referred to above all vary to a very considerable extent in the size of the pistillate spikes. Specimens with very short spikes, referable to *Carex strictior*, have been described as *Carex stricta* var. *curtissima* Peck. Such specimens have the perigynia very crowded, and on this account the perigynia not having a chance to properly develop often present a different appearance from specimens where they are less crowded. I regard these plants only as exhibiting individual peculiarities, and do not believe they should be given varietal recognition.

These same three species also often produce slender elongated pistillate spikes. Such specimens have of late years been going under the name *Carex stricta* var. *angustata* (Boott) Bailey, and

very narrow spiked forms have been called *Carex stricta* var. *xerocarpa* (S. H. Wright) Britton. However, the original *Carex angustata* Boott, on which the variety *angustata* is founded, is a plant from the Oregon-Washington region, and is entirely distinct from the eastern species. The narrow spiked specimens of the eastern plants do not seem worthy of recognition.

While it is not my intention in this paper to consider all the Pacific Coast species which are closely related to *Carex stricta*, I have included *Carex angustata* and certain plants confused with it. *Carex angustata* itself is distinguished from its eastern relatives by the finely many-nerved perigynia. It seems to be exactly the same plant afterwards described by Professor Bailey as *Carex acutina* and is of rare occurrence in collections. It is a slender plant with rather loosely cespitose culms and short ascending stolons. The lowest bract does not exceed the inflorescence, the lower sheaths are nearly if not entirely smooth, and the foliage is much less rough than in its eastern relatives.

More common in the same region is a much larger plant which has often been distributed as *Carex acutina* Bailey. In it the lowest bract much exceeds the inflorescence and the lower sheaths are strongly hispidulous. This species seems not to have been described and accordingly I am now proposing it as *Carex egregia*.

The plants from the eastern parts of the Rocky Mountains called *Carex acutina* seem to be either forms of *Carex aquatilis* Wahl. (*C. variabilis* Bailey), having sharp pointed scales exceeding the perigynia, or species closely related to it. They are but distantly related to the genuine *Carex acutina*.

The species here treated are separable as follows:

Culms very densely cespitose, forming bogs; short ascending stolons or long horizontal stolons not conspicuously developed. *C. stricta.*

Culms loosely cespitose, in clumps or beds; short ascending stolons or long horizontal stolons freely developed.

Loosely cespitose; with short ascending stolons.

Perigynia broadly oval or suborbicular, inflated, brownish at maturity (eastern United States). *C. Haydeni.*

Perigynia narrower, plano-convex, not inflated (Oregon and Washington).

Lowest bract exceeded by inflorescence; lower sheaths smooth. *C. angustata.*

Lowest bract exceeding inflorescence; lower sheaths hispidulous. *C. egregia.*

Forming beds; long horizontal stolons numerous.
Lower sheaths filamentose; perigynia granular-roughened, green; culms slender to base; lower sheaths little septate-nodulose. *C. strictior.*
Lower sheaths not filamentose; perigynia granular-roughened towards apex only, straw-colored; culms stout at base; lower sheaths strongly septate-nodulose. *C. Emoryi.*

CAREX STRICTA Lam. Encycl. 3: 387. 1789

"*Carex acuta* L." Muhl. Descr. Gram. 263. 1817.
Carex virginiana Smith, Rees' Cycl. 7 sp. 100. 1819.
Carex commutata J. Gay, Ann. Sci. Nat. II. 11: 198. 1839.
Carex Kelvingtoniana Steud. Syn. Pl. Cyp. 215. 1855.
Carex virginica Steud. Syn. Pl. Cyp. 217. 1855.
Carex tenuispica Boeckl. Flora 39: 225. 1856.
Carex tristicha Boeckl. Flora 41: 651. 1858.
Carex xerocarpa S. H. Wright, Am. Journ. Sci. II. 13: 334. 1866.
Carex angustata var. *α typica* and var. *β* (in great part) Boott, Ill. Car. 4: 173. *pl. 586, f. 1, 587.* 1867. Not *C. angustata* Boott; Hooker Fl. Bor. Am. 2: 218. 1867.
Carex angustata var. *xerocarpa* Bailey, Carex Cat. 1884.
Carex stricta var. *angustata* Bailey; A. Gray, Man. Ed. 6, 600. 1890.
Carex stricta xerocarpa Britton, Bull. Torrey Club 22: 222. 1895.

Growing in very dense tussocks, the culms aphyllopodic, 3–10 dm. high, slender, strict, exceeding leaves, very rough on the sharp angles, the faces concave, strongly filamentose and brownish or light purplish brown at base, the basal sheaths subcarinate. Leaves with well-developed blades three to five to a fertile culm, on lower fourth, often somewhat clustered, the sheaths slightly hispidulous, tight, hyaline and often brownish tinged opposite the blades, the blades 1.5–3 mm. wide, usually 1–3 dm. long, stiffish, deep green, the margins revolute, but blade itself channeled and keeled towards base, strongly roughened. Principal staminate spike usually one (with one or two smaller sessile ones near its base), erect, peduncled, 2–4 cm. long, 2.5 mm. wide, the scales oblong-obovate, obtuse, light reddish brown with lighter center and hyaline margins. Pistillate spikes usually two or three, erect, sessile, or lower slightly peduncled, more or less strongly separate, the upper often staminate above, the better developed 2–6 cm. long, 3–5 mm. wide, the perigynia closely arranged in several ranks (or spikes at times somewhat attenuate below);

bracts sheathless, their auricles inconspicuous, slightly dark-colored, the lower bract 1.5–3 mm. wide, shorter than inflorescence; the upper reduced. Scales variable, oblong-obovate to lanceolate, obtuse to acuminate, reddish, with lighter center and narrow hyaline margins, narrower and usually rather shorter than perigynia, appressed. Perigynia broadly to narrowly ovate, closely enveloping achene, plano-convex, not inflated, two-edged, granular-roughened, puncticulate, dark green, obscurely few-nerved dorsally, nerveless ventrally, 2.5 mm. long, 1.5 mm. wide, rounded and substipitate at base, short-tapering to the beakless or nearly so subentire whitish-tipped apex, the style short-exserted; achenes lenticular, broadly ovate, substipitate, 1.75 mm. long, 1.25 mm. wide; stigmas two.

SPECIMENS EXAMINED

MASSACHUSETTS: Cambridge, *Fernald*, June 10, 1891 (C.); Cambridge, *Underwood 2644*, May 9, 1891 (C.); Boston, *B. D. Greene* (C.); West Roxbury, *Forbes*, June 8, 1911 (K.M.).

RHODE ISLAND: Providence, *Olney*, June 8, 1871 (N. Y., C.); Providence, *Olney*, labeled *C. strictior* Dewey (C.).

NEW HAMPSHIRE: base of White Mountains, *Tuckerman* (C.).

NEW YORK: Bull's Head, Staten Island, *Britton*, June 2, 1889 (C.); Grant City, Staten Island, *Britton*, May 26, 1889 (C.); Suffern, *Schrank* (C.); West Hampton, *Delafield*, June 13, 1888 (C.); Junius, *Sartwell 54* (N. Y., C.); Prattsburgh, Steuben County, *Wright* (N. Y., C.), type of *C. xerocarpa* S. H. Wright; Philipstown, *Barratt* (C.); New York, *Torrey* (C.).

NEW JERSEY: Plainfield, *Tweedy*, June, 1884 (C.); Woodbridge, *Lighthipe*, May 3, 1890 (C.); Manchester, *Torrey* (C.); Pitman, Gloucester County, *Long 3425*, May 16, 1910 (P.); Farmingdale, *Long & Brown 3644*, May 28, 1910 (P.); Glassboro, Gloucester County, *Long 3360*, May 14, 1910 (P.); Delair, Camden County, *Long 3353*, May 10, 1910 (P.); Cape May Court House, *Long 7229*, June 1, 1912 (P.); Delanco, Burlington County, *Long 3466, 3467*, May 19, 1910 (P.); Cold Spring, Cape May County, *O. H. Brown*, June 26, 1911 (P.); Mickleton, *Crawford*, May 10, 1892 (P.); Kaighn's Point, Camden County, *MacElwee*, May 7, 1892 (P.); Batsto River, Burlington County, *Bassett 45*, May 25, 1912 (P.); Quinton, Salem County, *Long 3029*, April 22, 1910 (P.); Cranberry Lake, Sussex County, *Mackenzie 1294*, May 30, 1905 (K. M.);

Netcong, Morris County, *Mackenzie 3167*, June 21, 1908 (K. M.); Lakehurst, Ocean County, *Mackenzie 4546*, May 15, 1910 (K. M.); South Amboy, *Mackenzie 1223*, May 21, 1905 (K. M.); Charlotteburg, *Mackenzie 3083*, May 24, 1908 (K. M.); Chatham, *Mackenzie 174*, May 30, 1903 (K. M.); Greenwood Lake, *Mackenzie 2567*, May 19, 1907 (K. M.); Delaware, Warren County, *Mackenzie 5354*, May 10, 1913 (K. M.); Landisville, *Gross*, 1872 (P.); Camden, *Boice*, May 16, 1878 (P.).

PENNSYLVANIA: West Chester, *Pennell 1333*, May 29, 1909 (P.); Frazier's bog, Montgomery County, *Long 3354, 3356*, May 12, 1910, and *3773*, June 1, 1910 (P.); Tullytown, *Crawford* (P.); Corning, Lehigh County, *Pretz 5422*, May 30, 1913 (P.); Willistown, Chester County, *Stone* (P.); East Nantmeal Township, Chester County, *Pennell 2817*, June 14, 1911 (P.); Oxford, *Crawford*, June 8, 1892 (P.); Williamson, Delaware County, *Pennell 3770*, June 23, 1912 (P).; Allentown, *Pretz 4703*, June 28, 1912 (P.); Tullytown, *Keller*, June 12, 1897 (P.); Nottingham, Chester County, *Pennell & Long 3700*, June 22, 1912 (P.); Chester County, *Pennell 3910*, June 27, 1912 (P.); Penn Valley, *Crawford*, May 7, 1899 (P.); Nockamixon, *Crawford*, June 30, 1893 (P.); Penn Valley, *Crawford*, June 1, 1899 (P.); York County, *Glatfelter*, May 30, 1895 (K. M.); Penn Valley, *Pretz*, June 30, 1899 (P.); Centre Square, *Brinton*, May 20, 1892 (P.); Nockamixon, *Crawford*, June 30, 1893 (P.); Chester County, *Pennell 1398*, May 30, 1909 (P.); Lancaster, *Carter*, May 24, 1904 (P.); Stacy's Hollow, *Wister 46*, June 3, 1862 (P).

DELAWARE: Ashland, *Commons*, June, 1865 (P.); Greenbank, *Commons*, May 26, 1879 (P.).

ILLINOIS: Canton (*C. xerocarpa* S. H. Wright).

TENNESSEE: Jackson, *Bain* 489, May 15, 1893 (C.).

CAREX HAYDENI Dewey, Am. Journ. Sci. II. **18**: 103. 1845

Carex β erecta Dewey, Am. Journ. Sci. **10**: 265. 1826.
"*Carex aperta* Boott" Carey; A. Gray, Man. 547. 1848.
Carex aperta var. β Boott, Ill. Car. **4**: 132. *pl. 426*. 1867.
Carex aperta var. *minor* Olney, Exsicc. V. 15. 1871.
Carex stricta var. *decora* Bailey, Bot. Gaz. **13**: 85. 1888.
Carex stricta var. β *Haydenii* Kükenth.; Engler, Pflanzenreich 4^{20}: 330. 1909.

Cespitose, the culms slender, 3 mm. thick near base, 5–10 dm. high, aphyllopodic, sharply triangular and strongly roughened on the angles above, usually much exceeding the leaves, the fertile slightly or not at all filamentose at base. Leaves with well-developed blades two to four to a fertile culm, on the lower fourth but not bunched, the sheaths papery and yellowish- or whitish-hyaline ventrally, smooth or nearly so, the blades flat with slightly revolute margins, about 2.5 mm. wide, usually 1–2 dm. long, very rough towards the apex; sterile culm leaves longer. Terminal spike stiminate (usually with an additional sessile smaller one at base), linear, 2–4 cm. long, 3 mm. wide, the scales oblong spatulate, obtuse to acutish, reddish brown with lighter center and hyaline margins. Pistillate spikes two or three, erect, sessile or nearly so, approximate or a little separate, linear, 1.5–3 cm. long, 4–5 mm. wide, occasionally staminate at apex, scarcely attenuate at base, the perigynia very numerous, in few rows, spreading-ascending; bracts sheathless without dark colored auricles, the lowest 2 mm. wide, normally exceeded by inflorescence; the upper much reduced. Scales ovate or lanceolate, long acuminate to acute, narrower than but strongly exceeding perigynia, from dark brown to straw color, with lighter center and hyaline margins. Perigynia light brownish at maturity, flattened biconvex, broadly oval to suborbicular, two-edged nerveless or obscurely few-nerved, 2–2.5 mm. long, 1.25–1.75 mm. wide, membranaceous and slightly inflated, puncticulate and resinous dotted, minutely granular towards apex, round-tapering at base and apex and abruptly very minutely (0.2 mm. long) beaked, the orifice hyaline, entire or emarginate. Achenes lenticular, substipitate, apiculate, yellowish, with orbicular faces, 1 mm. long; style exserted; stigmas two.

This species has in times past been confused with *Carex aperta* Boott, a phyllopodic species from the Columbia River region. Although frequently treated as a variety of *Carex stricta* Lam., one cannot help feeling that this is due to lack of knowledge of the two species. They are really thoroughly distinct species, and I have seen no evidence of any tendency to intergrade.

SPECIMENS EXAMINED

NEW BRUNSWICK: Bathurst, *Fowler*, August 4, 1874 (N. Y.).

MAINE: Bangor, *Knight*, June 27, 1905 (K. M.); Bangor, *Mackenzie 3188*, July 3, 1908 (K. M.); Orono, *Harvey*, August, 1891 (N. Y.); Orono, *Fernald*, June 28, 1890 (C.); St. Francis, *Fernald 135*, August 5, 1893 (C.).

NEW HAMPSHIRE: Keene, *Gilbert*, June 11, 1877 (N. Y.).

MASSACHUSETTS: Dedham, *Forbes*, June 15, 1904, and June 9, 1914 (K. M.); Waverley, *W. Boott*, June 30, 1853 (N. Y.); "Mass.", *Davis* (C.).

RHODE ISLAND: *Olney* (C.).

NEW YORK: North Elba, *Peck* (N. Y.); Amherst, *Sartwell* (N. Y.).

NEW JERSEY: Lawrence, Mercer County, *S. Brown*, May 28, 29, 1904 (P.).

PENNSYLVANIA: Sellersville, Bucks County, *Pollard*, June 2, 1899 (K. M.); Sellersville, *Pretz*, June, 1883, May 16, 1896, and June, 1899 (P.); Plumsteadville, "*J.C.M.*", June, 1866 (P.).

ILLINOIS: Fountaindale, *Bebb*, 1870 (N. Y.); "Ill." *Vasey* (N. Y., C.).

MINNESOTA: Milaca, *Sheldon*, June, 1892 (C.); Nichols, *Sheldon*, June, 1892 (C.).

IOWA: Fayette, *Fink*, June, 1895 (N. Y.); St. Petersburg, *Parry* (C.).

MISSOURI: Lake City, Jackson County, *Mackenzie*, May 23, 1897 (K. M.).

NEBRASKA: "Nebraska Ter.", apparently duplicate of type (C.).

CAREX ANGUSTATA Boott; Hooker, Pl. Bor. Am. **2**: 218. 1840

Carex angustata Boott (in part), Ill. Car. **4**: 173. *pl. 586, f. 2.* 1867.

Carex acuta Bailey, Proc. Am. Acad. **22**: 86. 1886.

Carex acutina Bailey, Mem. Torrey Club 1: 52. 1889. Not "*Carex acutina* Bailey", Holm. Am. Journ. Sci. **16**: 34; or Kükenthal; Engler, Pflanzenreich 4^{20}: 319.

Loosely cespitose, with short ascending stolons covered with brown scales, the culms 3–6 dm. high, strongly aphyllopodic, slender, 3–4 mm. wide at base, 1.5 mm. above, exceeding the leaves, roughened above on the angles, brownish reddened and more or less filamentose at base. Leaves with well-developed blades usually three to five to a fertile culm, on the lower third, the blades light green ascending, flat to base with slightly revolute margins, smoothish beneath, 2.5–3 mm. wide, 1–4 dm. long, much roughened towards the attenuate apex, the sheaths smooth, membranous, easily breaking and slightly yellowish tinged ventrally. Staminate spike usually one, from little to strongly rough-peduncled, 2.5–5 cm. long, 3–5 mm. wide, the scales oblong-

obovate, obtuse, brownish-black with lighter center and slightly hyaline margins. Pistillate spikes three to five, erect, more or less strongly separate, the upper sessile, the lower short-peduncled, linear-cylindric, 2–4 cm. long, 3.5–5 mm. wide, the upper especially often staminate at apex, the lower slightly attenuate at base, the numerous perigynia ascending, closely packed in several ranks; lower bract leaflet-like, shorter than or sometimes nearly equalling inflorescence, sheathless; upper bracts shorter; auricles often darkened, the upper at least dilated. Scales oblong-ovate to lanceolate, obtusish to acuminate, narrower and from somewhat shorter to somewhat longer than perigynia, blackish with lighter center and slightly hyaline apex. Perigynia straw-colored, obovoid or oval, sessile or nearly so, two-edged plano-convex, finely many-nerved or nerveless when young, 3 mm. long, 1.5 mm. wide, glandular-puncticulate, slightly granular towards apex, not serrulate, round-tapering at base, abruptly apiculate, beaked, the beak 0.25 mm. long, with entire black-tipped orifice. Achenes lenticular, sessile, with obovate faces, 1.5 mm. long; stigmas two.

SPECIMENS EXAMINED

OREGON: Deschutes River, *Howell 935*, May 9, 1885 (N. Y., H.); Sauvie's Island, *Howell*, May 15, 1886 (N. Y.); "Oregon" 1883 (H.).

The original specimens of *Carex angustata* Boott were collected along the Columbia River in Oregon or Washington by Scouler and Tolmie. Later Dr. Boott, failing to notice that these specimens represented a different species than the eastern *Carex stricta* Lam., applied the name *Carex angustata* to the eastern plant. His reason for not taking up the name *Carex stricta* Lam. was that there was a common European species known as *Carex stricta* Good., and he believed that this name having come into common use should not be superseded by *Carex stricta* Lam., even though the latter was the earlier published name. His views on this point have, however, not prevailed, but later botanists in taking up the name *Carex stricta* Lam. have continued the confusion by tacking on the name *Carex angustata* to it as a slender-spiked variety, and have disregarded the real identity of this species.

Carex acutina Bailey has also been the source of much unnecessary confusion. The original comparison was with the European *Carex acuta*, an aphyllopodic species, and the original

specimens collected by Howell quite justify such a comparison. Later botanists have created confusion by applying the name to certain phyllopodic species related to *Carex aquatilis* Wahl. More justifiable was the confusion with the species immediately hereafter described.

Carex egregia sp. nov.

Loosely cespitose and short stoloniferous from slender creeping rootstocks, the culms 4.5–9 dm. high, 4.5 mm. wide at base, 1.5 mm. wide below spikes, slender but erect, sharply triangular with concave sides, slightly roughened above, exceeding leaves, strongly purplish tinged at base, aphyllopodic. Leaves with well-developed blades three or four to a fertile culm, on lower fourth, somewhat bunched, the blades flat to base with revolute margins, roughened towards apex, 2–3 mm. wide, usually 1–3 dm. long, the sheaths hispidulous, little carinate and sparingly septate-nodulose dorsally, and brownish tinged ventrally. Terminal spike staminate, stalked, 4 cm. long, 5 mm. wide, the scales obovate, obtuse, purplish black with white midvein not extending to apex. Lateral spikes four or five, the upper one or two small, staminate, the lower two to four pistillate (often staminate at apex), more or less strongly separate, sessile or short-peduncled, 2.5–4.5 cm. long, 5 mm. wide, with very many appressed-ascending perigynia in several-many rows. Lowest bract leaf-like, exceeding inflorescence, sheathless, dark tinged at base, the upper bracts reduced, not conpicuously dark-auricled. Scales lanceolate, acute, purplish black with white midvein, narrower and longer or shorter than perigynia. Perigynia plano-convex, obovate, 3 mm. long, 1.5 mm. wide, finely about three- to five-striate on both faces, brownish, puncticulate and granular-roughened, the margins sharp-nerved, not round, rounded and substipitate at base, rounded and abruptly minutely apiculate at apex, the orifice entire. Achenes lenticular, closely filling lower part of perigynia, brownish, 1.5 mm. long, substipitate, obovate; stigmas two.

Closely related to *Carex eurycarpa* Holm, a species with "rounded" perigynia, finely many-nerved on both faces and with more prominent emarginate beak. The type specimen was distributed as that species.

SPECIMENS EXAMINED

OREGON: Cascade Mountains, *Cusick 2989*, August 27, 1902 (N. Y., H.); Cycan Mountains, *Cusick 2757*, August 14, 1901

(H.); Silver Creek, Lake County, *Cusick 2729*, August 7, 1901 (N. Y., H.); Summit of the Cascades, *Cusick 2991*, August 14, 1902 (N. Y., H.).

WASHINGTON: Falcon Valley, *Suksdorf 5181*, July 15, 1905 (K. M., type).

IDAHO: Forks of St. Mary's River, *Leiberg 1174*, July 6, 1895 (N. Y.).

CAREX STRICTIOR Dewey; A. Wood, Class Book 582. 1845

"*Carex stricta* Good." Dewey, Am. Journ. Sci. 10: 269. 1826.

Carex Watsoniana Steud. Syn. Pl. Cyp. 215. 1855.

Carex angustata var. γ and var. β (in small part) Boott, Ill. Car. 4: 173. *pl. 588*. 1867.

Carex stricta var. *curtissima* Peck; Howe, Rep. N. Y. State Museum 15. 1895.

Cespitose, growing in beds (not in dense tussocks), freely long-stoloniferous, the culms aphyllopodic, 3.5–9 dm. high, erect, slender, sharply triangular, 3.5 mm. wide at base, 1.5 mm. above, very rough above, purplish tinged at base, exceeding leaves, the basal sheaths hispidulous, strongly filamentose. Leaves with well-developed blades three or four to a fertile culm, the blades at first glaucous-green or in age light green, revolute margined, flat to base, 2.5–3.5 mm. wide, mostly 2–4 dm. long, the margins very rough, the sheaths strongly yellowish-brown tinged ventrally. Terminal spike staminate, strongly peduncled, linear, 2–3 cm. long, 3 mm. wide, the scales oblong-obovate, obtuse, purplish-black with lighter center and narrowly hyaline margins. Lateral spikes mostly three, pistillate, approximate and sessile or nearly so, or the lowest often remote and slender long-peduncled, linear, 4–5 mm. wide, 1.5–3 cm. long, with very many ascending perigynia, closely (or at base more loosely) packed in several ranks. Lowest bract leaflet-like, about length of culm, sheathless; the upper much reduced. Scales lanceolate or oblong-lanceolate, obtuse or acute, narrower and from slightly shorter to slightly longer than perigynia, purplish black or in age deep reddish brown with lighter center. Perigynia plano-convex, ovate, closely enveloping achene, light green, granular-roughened, puncticulate, reddish dotted, obscurely few-nerved, 2.25 mm. long, 1.5 mm. wide, two-edged, not serrulate, rounded and sessile at base, abruptly very minutely beaked, the orifice entire. Achenes lenticular, light brown, oblong-obovate, 1.75 mm. long, 1.25 mm. wide, minutely apiculate, the short slender style tardily deciduous; stigmas two.

The original description of this species by Dewey in Wood's Class Book is not satisfactory and it is easy to understand why subsequent botanists have failed to recognize the plant. It is as follows:

"Staminate spikes 1–2 with oblong and blackish acutish glumes; pistillate spikes 2–3, cylindric, staminate above, and hence acutish, lowest short pedunculate; perig. ovate, compressed, acute, glabrous, entire at the orifice, early falling off, glabrous, a little longer than the oblong and acute glume; st. a foot and more high, triquetrous and rough on the angles, with reticulated filaments connecting the leaves towards the base; lvs. erect, close; whole plant glaucous, except the spikes.—Wet places, common."

In 1826, however, in his articles on caricography he had described two closely related plants, one of which he called *C. acuta*, and the other of which he called "*Carex stricta* Good." His description of the latter (Am. Journ. Sci. **10**: 269) is an excellent description of the plant I am now treating as *Carex strictior* Dewey. After a thorough technical description, in which he speaks of the nearly black pistillate scales and filamentose sheaths, he says, "color of the plants, except the spikes glaucous green," and ends up with the following:

"This species, found in England and Sweden, was first recognized in our country, by Mr. Schweinitz. It has probably been confounded with C. acuta, which it much resembles. There can be no doubt however that it is a distinct species. Though it grows in similar situations with C. acuta, it does not form a *bog*, but spreads over the surface of the marsh. It differs from that species too in its color, in the appearance of its spikes, in its more stiff and erect form and in its fruit being *caducous*" [italics Dewey's].

It will be noted that the points emphasized by him are the same points emphasized in his description of *Carex strictior* (*supra*), namely, color of plant, "more stiff" form, "strictior," and "caducous" or "early falling off" perigynia. His *Carex strictior* grows in wet places and no mention is made of its growing in bogs (i. e., dense tufts).

Again while he included a description of *Carex stricta* in Wood's Class Book he did not emphasize any of the points emphasized by him in 1826, and he speaks of the plant being found in "wet

places, as bogs." What then apparently happened is that in the interval between 1826 and 1843 Dewey found out that his original "*Carex stricta* Good." was different from that European species. So he made up a new name to apply to his plant, namely *C. strictior* Dewey. And at the same time he applied the name *Carex stricta* to our common densely tufted species.

As bearing out these views as to the identity of *Carex strictior* it is to be noted that in the 1863 edition of Wood's Class-Book Dewey added to his description of *C. strictior*, the words, "Nearer *C. caespitosa* than *C. stricta*," his *Carex caespitosa* being the strongly stoloniferous, bed-forming *Carex Goodenovii*.

Dewey's own herbarium does not aid very much. It contains four specimens kindly lent me by Professor Fernald. Three of these, collected and distributed by Sartwell, represent the species I take to be *C. strictior*. The fourth specimen collected by Olney is a specimen of *Carex stricta* Lam. Similar specimens collected by Sartwell and Olney are in the Torrey herbarium at the New York Botanical Garden.

The fact that this species is distinct from *Carex stricta* has been noted by a number of botanists. Thus, on a specimen in the Philadelphia Academy collected in 1892 by Mr. Benjamin Heritage, we find him noting it as "a form that does not grow in tufts, but is stoloniferous." Mr. Bayard Long in 1910 collected it at Frazier's Bog, near Philadelphia, noting its difference in habit of growth; and Mr. E. P. Bicknell and Dr. Wm. H. Wiegmann have both collected it around New York as *Carex aquatilis*, which in manner of growth it much resembles. And correspondence with Dr. E. H. Eames and Mr. F. F. Forbes has resulted in specimens from them both from plants which they had previously seen were distinct from *Carex stricta*.

The specimens listed below are to be referred to this species. Some are so poor that their identification has been difficult.

SPECIMENS EXAMINED

MAINE: Veazie, *Knight*, July 15, 1905 (K. M.); Fort Kent, *Mackenzie 3436*, *3424*, *3427*, July 11, 1908 (K. M.); *3663*, July 23, 1908 (K. M.); Somesville, Mt. Desert Island, *Rand*, June 24, 1891 (C.); Foxcroft, *Fernald 231*, June 25, 1895 (C.).

NEW HAMPSHIRE: Muik Pond, Lisbon, *Graves*, June 9, 1893 (C.); base of White Mountains, *Oakes* (N. Y., C.).

MASSACHUSETTS: Chapman, no data (C.); Williamstown, no data (C.); Tewksbury, *Forbes*, June 7, 1911 (K. M.).

RHODE ISLAND: Providence, *Olney*, June 8, 1871 (K. M.); Cat Swamp, Providence, *Collins*, June 19, 1892 (C.).

CONNECTICUT: Easton, *Eames 8743*, June 3, 1914 (K. M.).

ONTARIO: Thedford, Lambton County, *Dodge*, June 22, 1911 (K. M.).

NEW YORK: Penn Yan, *Sartwell* (one in N. Y. Herb. and three specimens in Dewey Herb. and one in W. Boott Herb., H.); Van Cortlandt, *Bicknell*, June 1, 1890 (C.); Wellesley Island, Jefferson County, *Robinson & Maxon 28*, June 28, 1902 (N. Y.); *Torrey*, no data (C.); Junius, *Sartwell 55* (N. Y.); Junius, *Sartwell*, labeled "*Carex aquatilis*" (C.); N. Y., *Crawe* (C.); Litchfield, *Hunt*, June 1873 (N. Y.); Herkimer County, *Haberer*, June 24, 1882 (C.).

NEW JERSEY: Mickleton, *Heritage*, June 5, 1892 (P.); New Egypt, *J. H. Grove*, May 21, 1905 (P.); Repaupo, *Crawford*, June 15, 1893 (P.); Lindenwold, *Githens*, June 28, 1902 (P.); Lawrence, *Mackenzie 5868, 5874*, May 31, 1914 (K. M.); Oak Ridge, *Mackenzie 3185, 3182, 3186*, June 28, 1908 (K. M.); Hoboken, *A. Brown*, 1877 (C.); "New Jersey" *Knieskern 57*, as *Carex salina* Wahl.? (C.); Manchester, *Knieskern* (C.).

PENNSYLVANIA: Mountainville, Lehigh County, *Pretz 319*, May 30, 1907, *429*, June 22, 1907 (P.); Springfield, Bucks County, *Pretz*, June 1886 (P.); "Marshall road" *C. E. Smith*, May 21 (P.); Penn Valley, Bucks County, *Crawford*, June 1, 1899 (P.); Allentown, *Pretz 49*, May 18, 1901, *5503*, June 17, 1913, *1238*, June 11, 1908 (P.); Sellersville, *Crawford*, June 11, 1899 (P.); Slatington, *Bachman 2085*, May 13, 1911 (P.); Frazier's Bog, Willow Grove, Montgomery County, *Long 3771, 3767, 3768, 3774, 3769*, June 1, 1910, *9434*, June 7, 1914, *3355*, May 12, 1910; Byberry, *Martindale*, June 1865 (P.); Tinicum Meadows, Delaware County, *B. H. Smith*, May 30, 1898 (P.); Lowhill, Lehigh County, *Pretz 4677*, June 23, 1912 (P.); Lehigh County, *Krout;* Easton, *Porter*, July 8, 1890 (C.); Long Pond, Monroe County, *Britton*, June 24, 1895 (C.); Bucks County, *Pretz*, May 30, 1899 (P.).

DELAWARE: Centreville, *Commons*, May, 1864, and June 14 1868 (P.); Greenbank, *Commons*, May 27, 1879, and May 1, 1882 (P.); May 26, 1879 (var. *curtissima*) (P.).

MARYLAND: Conowingo, Cecil County, *Bartram & Long 1250*, June 1, 1913 (P.).

NORTH CAROLINA: Hendersonville, *Biltmore Herb. 1818a*, May 27, 1898 (K. M., N. Y.); Highlands, *Biltmore Herb. 4990b*, June 5, 1897 (N. Y.); Mitchell County, *Ashe*, May (N. Y.); Macon County, Buckley (C.).

TENNESSEE: Thompson's, *Ruth 978*, May, 1894 (N. Y.).

MICHIGAN: Port Huron, *Dodge*, May 30, 1911 (K. M.); Grand Rapids, *Miss Cole*, May 16, 1898 (K. M.); Emerson, Chippewa County, *Dodge*, June 16, 1914 (K. M.); Buchanan, *Deam 14195*, May 29, 1914 (K. M.); Vermilion, Chippewa County, *Dodge*, June 21, 1914 (K. M.); Olivet, *McClatchie*, May 24, 1888 (N. Y.); Lake Superior, *Pitcher* (C.); Hubbardston, *Wheeler*, June 25, 1890 (C.).

OHIO: London, *Sharp*, 1910 (N. Y.); "ad ripas Ohionis," *Lesquereux 551* (N. Y.).

WISCONSIN: Milwaukee, *Hasse*, May 27, 1882, and June 3, 1883 (N. Y.).

ILLINOIS: Winnebago County, *Bebb*, 1870 (C.); Chicago, *Moffat 88*, June 24, 1893 (N. Y.).

IOWA: Charles City, *Arthur* (C.).

NEBRASKA: "Nebraska" no data (C.).

CAREX EMORYI Dewey, Bot. Mex. Bound. 230. 1858

Carex virginiana var. *elongata* Boeckl. Linnaea **40**: 432. 1876.

Carex stricta var. *Emoryi* Bailey, Proc. Am. Acad. **22**: 85. 1886.

Carex acuta var. Reverchon's distr. Texan Pl. 1407; Bailey, l. c. 1886.

"*Carex stricta* Lam." Mackenzie & Bush, Fl. Jackson Co. Mo. 49. 1902.

"*Carex stricta* var. *angustata* (Boott) Bailey", Mackenzie & Bush, l. c. 1902.

Carex milligrana Holm, Am. Journ. Sci. **17**: 311. 1904.

Loosely cespitose, growing in beds, with long slender rootstocks, the culms aphyllopodic, 4–10 dm. high, erect, 6–8 mm.

wide at base, slender, sharply triangular and from strongly roughened to nearly smooth above, exceeding leaves, purplish tinged at base, the basal sheaths smooth, not filamentose. Leaves with well-developed blades usually three or four to a fertile culm, on lower fourth, but not clustered, the blades light green, ascending, somewhat nodulose, flat to base with slightly revolute margins, much roughened towards apex, 3–5 mm. wide, 1.5–4 dm. long, the sheaths very membranaceous ventrally, slightly yellowish tinged. Terminal spike staminate, strongly peduncled, linear, 2–4.5 cm. long, 4 mm. wide, the scales oblong-spatulate, obtuse or acutish, brownish with broad lighter center and hyaline margins. Lateral spikes four to six, the upper one or two staminate, the lower pistillate or often staminate at apex, erect, sessile or the lower short-peduncled, linear, 2–10 cm. long, 4–6 mm. wide, with very many ascending perigynia closely (or at base more loosely) packed in several ranks. Lowest bract leaflet-like, from about equalling to exceeding culm, sheathless; the upper much reduced. Scales lanceolate, obtusish, short-acute or acuminate, scarcely 1 mm. wide, narrower and from somewhat shorter than to strongly exceeding perigynia, light or purplish brown with broad lighter center falling with the perigynia. Perigynia plano-convex, ovate or obovate, closely enveloping achene, at first light green, soon straw-colored, slightly granular-roughened towards apex, puncticulate, somewhat reddish dotted, few-nerved dorsally, 2–2.5 mm. long, 1.5–1.75 mm. wide, two-edged, not serrulate, rounded and sessile at base, abruptly apiculate-beaked, the orifice whitish, entire. Achenes lenticular, oblong-quadrate, substipitate, 1.5 mm. long, 1 mm. wide, minutely apiculate, the short slender style tardily deciduous; stigmas two.

SPECIMENS EXAMINED

NEW JERSEY: Scudders Falls, *Mackenzie 5062*, June 9, 1912 (K. M.); Red Bank, Gloucester County, *Parker*, June 6, 1872 (K. M., P.); Delaware, *Mackenzie 4998*, May 30, 1912 (K. M.); Crosswicks Creek, *Mackenzie 5809*, May 21, 1914 (K. M.); Coopers Creek, *Parker*, July 14, 1868 (P.); Camden, *Parker* (P., C.); Swedesboro, *Lippincott*, May 30, 1892 (P.).

PENNSYLVANIA: Bethlehem, *Schweinitz;* York Furnace, *Stone*, May 30, 1907 (P.); Penn Valley, *Crawford*, June 12, 1895 (P.); Tinicum, *Saunders*, May 20, 1898 (P.); Tinicum Township, *Saunders*, June 19, 1897 (P.); Penn Valley, Bucks County, *Crawford*, June 1, 1899 (P.); Kintnersville, *Van Pelt*, June 19, 1905

(P.); Narrowsville, *Lippincott*, May 30, 1893 (P.); Chester County, *Canby* (H.); Fort Washington, Montgomery County, *Long*, June 11, 1909 (P.).

DELAWARE: Hollyoak, *Commons*, June 6, 1866 (P.).

MARYLAND: Frederick County, *Aikin* (C.).

DISTRICT OF COLUMBIA: *Steele*, May 18, 1908, and May 12, 1902; *Vasey*, 188–.

INDIANA: Carmel, *Mrs. Deam 10548*, May 9, 1912 (K. M.); Cedarville, *Deam 14280*, June 14, 1914 (K. M.).

ILLINOIS: *J. Wolf*, no data (K. M.).

MANITOBA: Brandon, *Macoun 13357*, June 8, 1896 (N. Y.).

IOWA: Marshalltown, *Ball 381*, May 15, 1897 (K. M.); Council Bluffs, *Nicollet*, 1845 (C.).

MISSOURI: Greenwood, *Bush 6708*, May 20, 1912 (K. M., N. Y.); Monteer, *Bush 2896A*, May 17, 1905 (K. M.); Courtney, *Bush 6730*, May 28, 1912 (K. M.); Courtney, *Bush 6755, 6758*, June 2, 1912 (K. M.); Independence, *Bush 703*, May 23, 1894 (K. M., C.); Greenwood, *Mackenzie*, May 9, 1897 (K. M.); Buckner, *Bush 6762, 6776* (N. Y., K. M.), June 5, 1912 (K. M.); Lake City, *Mackenzie*, May 23, 1897 (K. M.); Sarcoxie, *Palmer 3706*, May 19, 1912 (N. Y.); Independence, *Bush*, June 3, 1888 (N. Y.); St. Louis, *Riehl 30*, June, 1838 (C.).

NORTH DAKOTA: Towner, McHenry County, *Lunell*, May 29, 1908, and June 12, 1913 (K. M.); Minot, Ward County, *Lunell*, July 7, 1907 (K. M., N. Y.); Ward County, *Haigh 224*, 1900 (N. Y.), June 24, 1908 (N. Y.).

SOUTH DAKOTA: Rosebud Creek, *E. J. Wallace*, July 2, 1896, type of *C. millegrana* Holm (K. M., N. Y.): Brookings, *Williams & Carter*, June 19, 1897 (K. M.); Sylvan Lake, Black Hills, *Rydberg 1085*, June, 1892 (N. Y.); Brookings, *Carter*, June 10, 1897 (N. Y.).

NEBRASKA: Ashland, *Williams*, May 1890 (K. M., N. Y.); Fort Niobrara, *Wilcox*, May, 1888 (C.).

KANSAS: Manhattan, May 16, 1889 (C.); Riley County, *Norton 553*, May 23, 1895 (N. Y.); Osborne City, *Shear 51*, May 26, 1894 (C).; Wichita, *Carleton*, May 9, 1888 (C.).

OKLAHOMA: Sapulpa, *Bush 1070*, May 2, 1895 (C.).

COLORADO: Fort Collins, *Marshall 2534*, June 12, 1899 (N. Y.); Fort Collins, *State Agr. Col. 2570*, June 7, 1898 (N. Y.).

TEXAS: Llano County, *Reverchon 1407*, May 1885 (K. M., N. Y.); Upper Rio Grande, *Bigelow*, Mexican Boundary Survey, duplicate of type (C.).

INDEX TO AMERICAN BOTANICAL LITERATURE

1912–1915

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in the broadest sense.

Reviews, and papers that relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omissions, their kindness will be appreciated.

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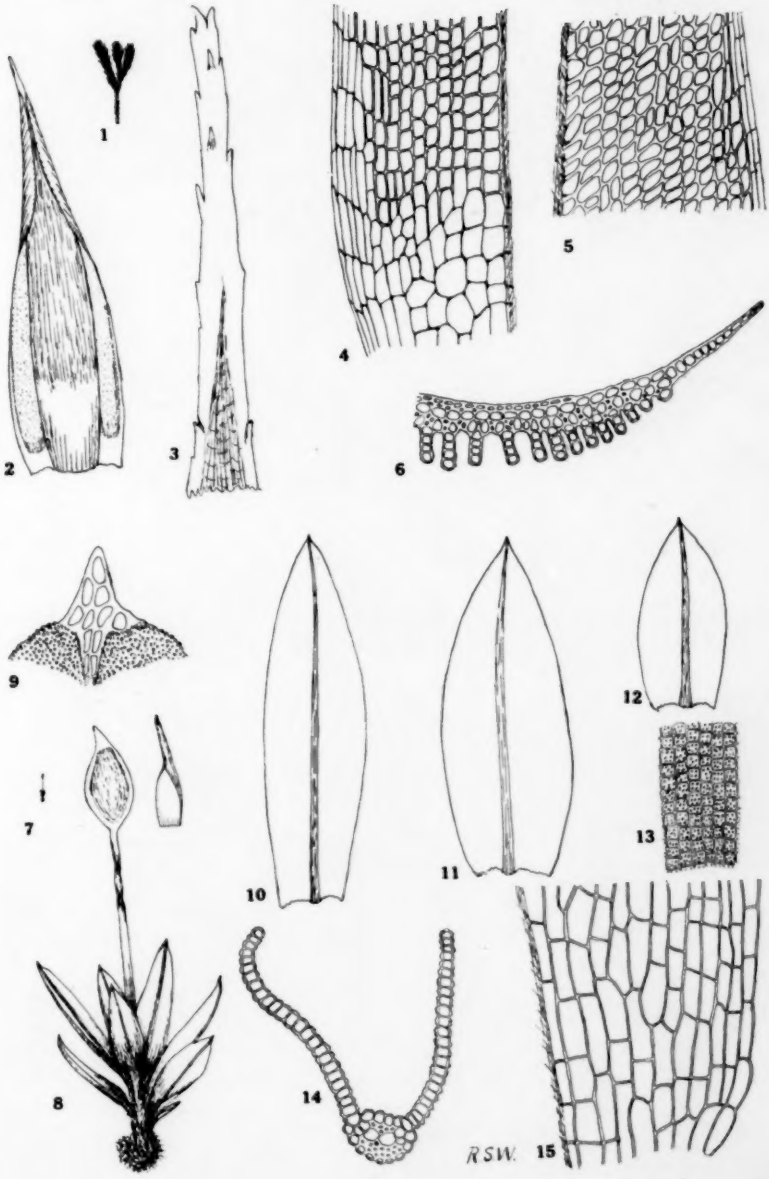
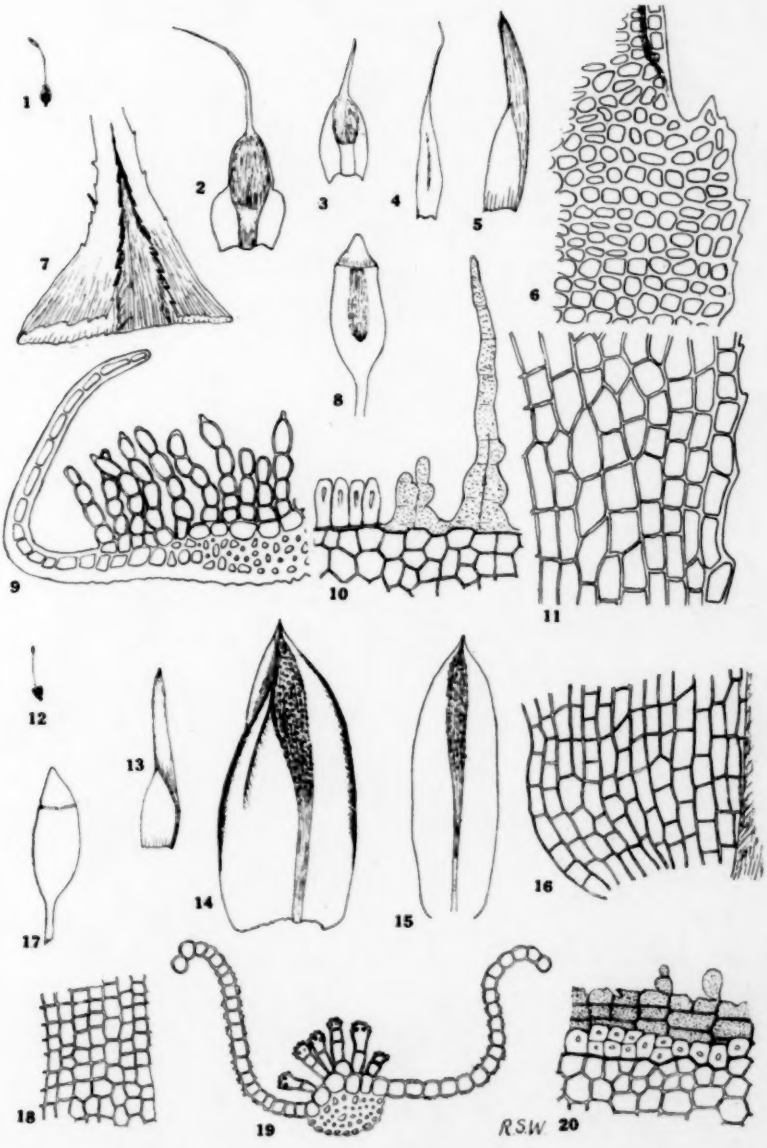
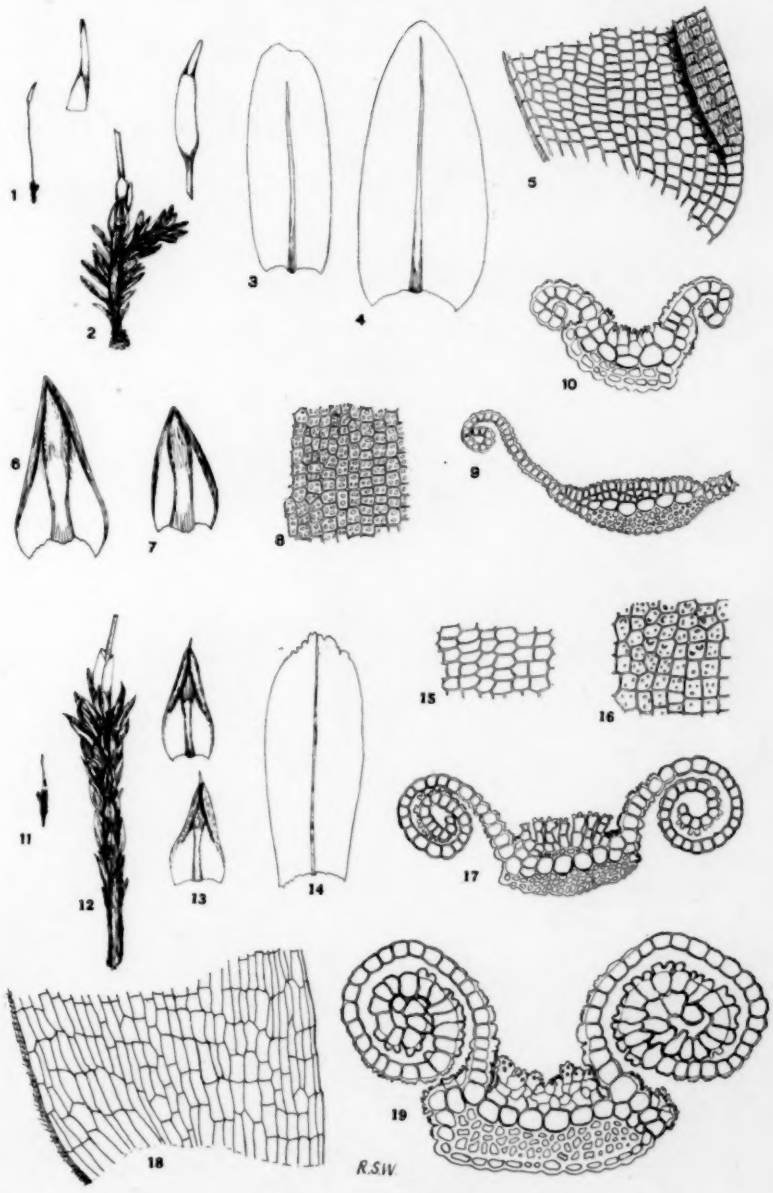


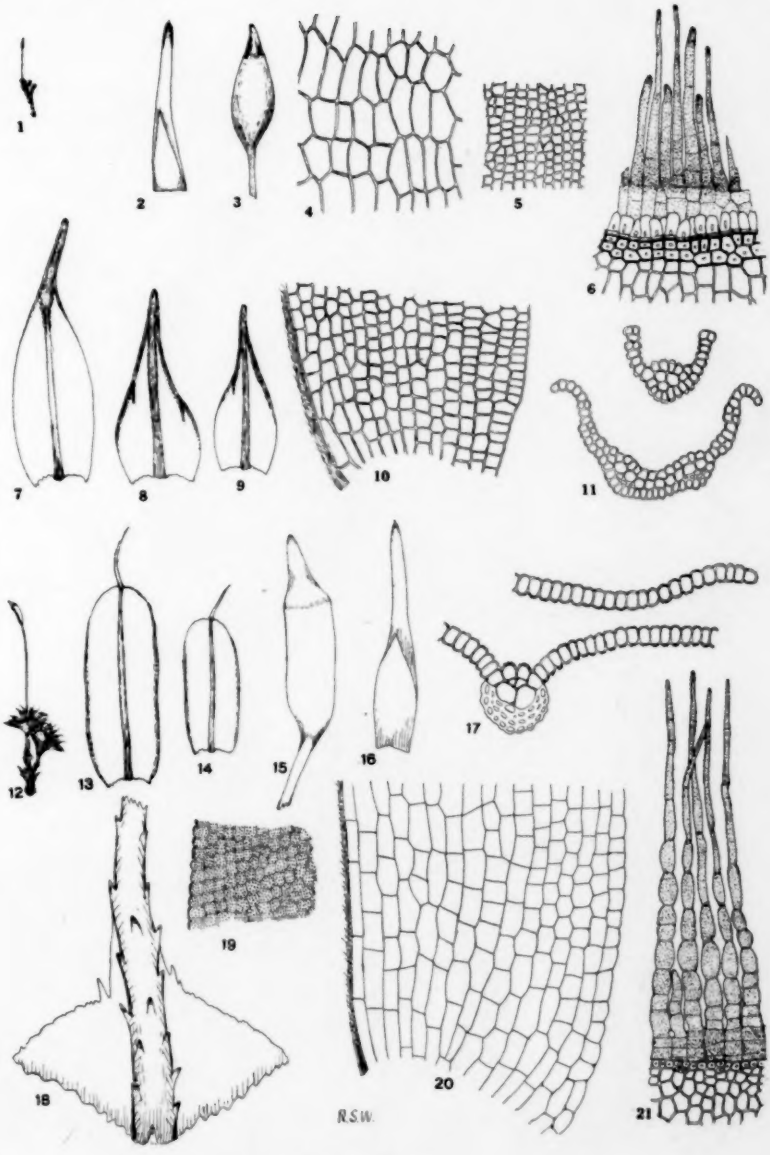
1–6. CAMPYLOPUS PERUVIANUS R. S. WILLIAMS
7–15. ASTOMUM CHILENSE R. S. WILLIAMS



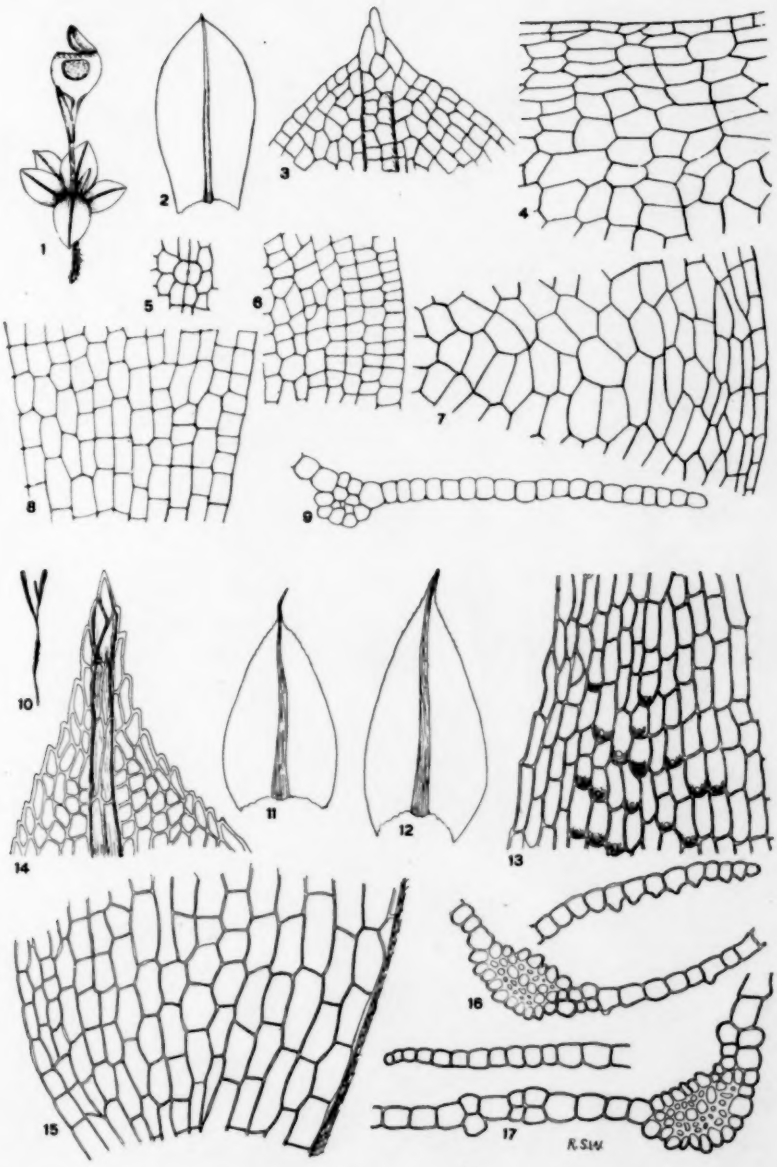
1–11. PTEROGONEURUM ROSEAE R. S. WILLIAMS
12–20. CROSSIDIUM ROSEI R. S. WILLIAMS



1–10. PSEUDOCROSSIDIUM CHILENSE R. S. WILLIAMS
11–19. PSEUDOCROSSIDIUM APICULATUM R. S. WILLIAMS



1–11. TORTULA MINUSCULA R. S. WILLIAMS
12–21. TORTULA LIMENSIS R. S. WILLIAMS



1–9. PHYSCOMITRIUM ROSEAE R. S. WILLIAMS
10–17. PHILONOTIS FRAGILICAULIS R. S. WILLIAMS